Barbara Loyd's
Community Relations
Department
O.E.O.

ONTARIO CRIPPLED CHILDREN'S CENTRE

BLISS PROJECT 1972 - 73.

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## THE LINGUIST'S REPORT

The linguist joined the Bliss Project in mid-February, 1973, half-way through the school year and when some children had already been using Bliss symbols for some 17 months. Beyond an introductory set of 30 to 40 symbols, two standardized arrays had been established and had been in operation since September 1972; one, displaying 340 symbols, for the children who could point directly to the symbols with their fingers, and the other for those children who could not point and needed a mechanical interface, with 100 symbols arranged across an arc.

The overall aim of the Project is to provide an effective means of expressive communication, equivalent in function to speech, for children physically unable to speak. With this in mind the linguist's objectives for the rest of the school year were:

1. to assess the system currently in use;
2. to propose any changes that could be made to improve communication;
3. to continue the development of an appropriate communication system.

## BLISS SYMBOLS AND COMMUNICATION

An ideographic or pictographic script in which the basic graphic units relate directly to units of meaning rather than to units of sound is a perfectly viable means of representing spoken language. It is not intrinsically inferior to an alphabetic system, and can convey just the same information with equal clarity. The Chinese script, for instance, is basically ideographic; in this case the symbols have lost any transparent connection they may have had with their meanings, and they also tend to be quite complex visually, but as a form of conveying language it is just as adequate as written English. While many pictographic systems exist for particular restricted domains, such as road-signs, cartographic symbols, signs used to depict events at the Olympic Games, etc.,[1] these could not simply be fused neatly into one, since their principles of design would not be consistent with one another; and in any case they would still

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# ONTARIO CRIPPLED CHILDREN'S CENTRE

## BLISS PROJECT

## 1972-73 YEAR-END REPORT


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leave the vast bulk of the everyday vocabulary unaccounted for. The advantage of Bliss' "semantography" is that it is designed as a comprehensive code, covering every aspect of human experience. His symbols consequently form one coherent and consistent system. Furthermore they are designed to show a clear relationship with the concepts they represent, making use wherever possible of simple outline depictions of their denotata (as in the case of parts of the body, house, tree, etc.), and following widely known conventions such as arrows to indicate direction of movement, or a heart to indicate an emotion. Where a concept cannot be portrayed by a single element, two or more symbols are combined to form a compound; although there are in fact many gaps in the vocabulary which Bliss presents in his Semantography, morphological patterns are provided for deriving new compound symbols.

Another positive feature in Bliss' symbols, particularly for the teacher in the classroom, is that they can be quickly and unambiguously reproduced by hand.

Semantography thus contains a lexicon or inventory of meaningful units, in which the symbols are equivalent to the morphemes of a spoken language. In conjunction with an adequate syntax (or rules for the formation of sentences) Bliss' symbols provide a potentially workable vehicle for the communication of any aspect of human thought.

## THE CHILDREN'S PHYSICAL HANDICAPS AND COMMUNICATION

With respect to the development of fluent language skills, the handicaps of the children for whom the Bliss Symbols have been adopted at the O.C.C.C. pose two crucial physical problems, one of space and one of speed.

Firstly, as large an expressive vocabulary as possible must be available to the child: the more he is able to say, the more important the tool of language will be to him and the more he will wish to communicate. The more a person is able to communicate, the more he will be able to participate in a meaningful way in normal life. Apart from considerations of visibility the size

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of the vocabulary accessible at any one time is limited to what can be displayed on a tray within the child's reach and within his capability of manual precision. In the case of the more severely involved children, it is further limited to the number of display units that the electronic equipment can accommodate.

Secondly, the child must be able to communicate rapidly enough to sustain the attention of his interlocutor, who may be a mother busy with household chores or a teacher with a classroom of other children to attend to. (Ann, one of our most handicapped children, was timed on her electronic display as producing eight words, or rather, symbols, in 20 minutes, or one word every 150 seconds. (See the Education and Psychology Reports.) In normal speech, an eight-word sentence might be uttered in three or four seconds, at a rate of more than two words a second.) If excessive demands on time are made, the child's linguistic output may be brushed aside or overlooked, and his attempts at communication will be frustrated all the more.

Unfortunately these two problems of space and speed conflict. The larger the vocabulary is, the slower access becomes to any particular item. The dilemma is particularly acute where a mechanical interface is required - and this is the primary reason for any difference in style of symbol usage in the two groups of children.

The linguist's domain of concern in the Bliss Project can be divided into four areas:

1. design of the symbols
2. selection of the lexicon
3. arrangement of the display
4. development of the syntax

It seems most appropriate to handle the two groups of children separately, under the above headings, and to give an overview of what had been accomplished in each case before the linguist joined the team and of how the system has developed since then.

## A. THE "340" CLASS

### 1. DESIGN OF THE SYMBOLS

As stated above, Bliss symbols form a coherent system following fairly consistent principles of design. A linguist cannot be expected to be an expert in graphic design, but from a layman's point of view they seem to be easily distinguishable to the eye and they are simple to draw. Their semantic motivation (the connection between the symbols and what they represent) is quite transparent, or at least can be explained in such a way that the visual composition of a symbol serves as a mnemonic in remembering its meaning. For these reasons, the design of the great majority of the symbols is excellent; and indeed they have proven to be easy for the children to learn and to associate with a concept or word, the original reason for preferring such symbols over conventional orthography.

However a small number of compound symbols on the tray were not consistent with the morphology underlying the original symbols. These have been corrected in preparation for the new display planned for September, 1973.

The symbols were not presented in the 340 and 100 displays in isolation: beneath each a corresponding word was printed. This is a necessary compromise to enable those who are not conversant with Bliss' system to interpret the child's output. It was observed that the most usual behaviour of an adult (or for that matter of "normal" children visiting the Bliss Classroom) when responding to the children was to read out the respective word as each symbol was indicated. Restricting the range of responses for each symbol to a single word does not result in grammatical spoken English, nor does it exploit the potential flexibility of the symbols and might in fact discourage the child from using his vocabulary inventively. A single Bliss symbol can render several different English words, depending on the context. For instance  "to speak" can also represent "say" and "tell",  "to see" also "watch" and "look (at)",  "child' also "kid", "boy" and "girl". Since space does not in most cases allow the inclusion of more than one word beneath the symbol, it was suggested that a

person talking with a child who is already familiar with the symbols (see note p.11 should himself vary his response to each symbol according to the context of the situation, and restrain himself from verbalizing the child's output until an utterance was complete, so as to provide richer, more appropriate and more grammatical feedback to the child. Instructions to this effect were written up and passed out to parents and to volunteer workers (Appendix E). The teachers were likewise advised to offer more varied and appropriate responses, sensitive to the context, than a simple reading of the printed words would allow.

## 2. SELECTION OF THE LEXICON

A gross division of the English lexicon may be made into content or lexical words on the other hand, and function or grammatical words on the other. Content words include nouns, verbs and adjectives; function words cover, for instance, the definite and indefinite articles, prepositions, conjunctions, verbal auxiliaries, etc., which have no concrete denotative value in themselves, but which help to knit a sentence into a coherent whole, specifying relationships and delimiting the range of the content words. Bliss' symbols may be divided into similar groups.

The 340 display comprises:

a small set of "function" symbols (primarily prepositions and a set of grammatical elements, indicating tense, antonymy and similarity, plurality etc., or converting a symbol of one category into another, say a noun into a verb or adjective);

a wide range of "content" symbols covering many aspect of the handicapped child's everyday experience; numerals and mathematical operators;

and a handful of common phrases which play an important part in everyday social communion (Hello-goodbye, thanks, I'm sorry,.....).

By February 1973, an additional 100 or so symbols, in the main having to do with special occasions (Christmas, birthdays, etc.), had been presented to the children. Along with the letters of the alphabet, they were arranged loosely around the perimeter of the display. On the whole, they were composed of

combinations of symbols already in the 340.

While a vocabulary of 350-450 words forms just a small fraction, perhaps 5%, of that of a normal 7 or 8 year old, the original 340 had been selected very much with economy in mind, so that by simple combining strategies the vocabulary could be considerably increased. Each digit was conflated with a colour, the child being able to specify beforehand which he intended. Rather than including both members of antonymous pairs of adjectives, prepositions and verbs, only one was given, since its antonym can be expressed by means of the symbol "opposite".

The 340 vocabulary had been selected by the members of the Bliss team, all intimately associated with handicapped children, and experienced in their care. This vocabulary seems to be well adapted to the special needs and peculiarities of young children and of young handicapped children in particular. A child tends to learn first the label by which an object or a concept is most commonly named,[3] and on the whole the 340 symbols are associated with common and fairly specific words. In one instance where a generic term, "animal" was used, the children had no difficulty in using an initial letter of the alphabet to specify a particular kind of animal (thus getting good exercise at the same time in preparation for reading and writing). While "boy" and "girl" are missing from the display, they were easily rendered by the combination of "man" or "lady" and "child". Some other generic terms, such as "furniture" and "cutlery" I did not observe being used at all, and may not be appropriate for these children. Similarly, the children did not seem ready for the mathematical terminology, such as the higher multiples of ten, "multiply", "add" etc. However it should be pointed out that whether a child uses a particular symbol or not probably depends to quite a large degree on the extent to which he is encouraged to use it by the adults around him, and not necessarily on its potential usefulness.

In May 1973 the 340 was replaced by a new 400-plus-alphabet display. Only two of the 340 symbols were removed, one, "to help" being already duplicated by the noun "help", and the other, "puppet", readily composed by combining "doll"

and "hand". In consultation with other members of the team, some fifty new symbols were included, supplementing both the lexical and grammatical sides of the vocabulary. The inclusion of the definite and indefinite articles is felt to be of particular importance in providing a vocabulary which will permit English-like sentence structure. Sixteen spaces on the new display were left blank, to allow for some flexibility in the system and some individualisation; these spaces can be occupied by symbols, temporary or permanent, which will accommodate a child's special interests, or an occasion which has prominent but short-lived appeal, such as a birthday.

On the suggestion of Mrs. McNaughton, a definite strategy for forming new compound symbols was devised, using the symbol "to combine" as a bracket enclosing the symbols in question. It is hoped that with this resource the children will be able to expand their expressive vocabulary beyond what is immediately accessible. At the same time as the 400-display was introduced, the children's c.100 incidental or peripheral items were removed from their trays. This was done so as to stimulate the use of the combining-strategy and thus to develop the children's inventiveness and skill in expressing themselves. Within the next month, all four children were in fact exploiting the procedure quite effectively.

Apart from the invention of new symbol combinations, it is possible to increase the given vocabulary in two ways, by semantic or by phonic extension. Since the entire Bliss System springs from the notion of semantic motivation, and since the teachers emphasize the representative aspect of the symbols when they are first teaching them, it is not surprising to find the children spontaneously extending the symbol to a concept beyond the associated printed word, but related to it. "Table", for instance, has come to refer the children's trays, and from there by metonymy to the symbol displays which now form such an integral part of the trays; the word "bring" was not included in either the 340 or the 400 vocabularies, but it is sometimes indicated by the symbol "to come" (the meaning of "come" being included as a semantic component in the meaning of "bring".

It is interesting to find that the children (particularly Kari) are also relating to the phonic form of the words printed with the symbols, dissociating the sound of the word from the meaning of the symbol as it was taught to them, as when a symbol is applied to homophones which may even belong to completely different grammatical categories. Thus "to play" has been used for a (theatrical) play, the preposition symbol "to" for "too, also", "no" for "know", the symbol for the "present" tense for a "present" (gift). In spite of their lack of a reinforcing motor pattern for each word (a sequence of movements of the articulatory organs), it seems that at least some of the children encode or store homophonous words together, according to their common auditory characteristics. It is perhaps impossible to discover for sure who initiated such double usage of the symbols, but even if it was not the child himself but a parent or other adult, the strategy is still picked up by the child.

While exploitation of both the semantic and phonic extension strategies helps to increase the size of the child's vocabulary, at the same time it increases ambiguity. The essence of Bliss' system is its semantic motivation, and it was therefore decided to encourage the former strategy over phonic extension (resulting, for instance, in the use of the symbol "to understand", rather than "no", for the verb, to know).

## 3. ARRANGEMENT OF THE 340 DISPLAY

The 340 symbols were arrayed over a 20 x 16 matrix with two additional 5 x 2 blocks on the lower edge, leaving a gap in the centre to fit the arc of the tray around the child's body.

The symbols were grouped into 34 5 x 2 divisions, dubbed "multisymbols". As far as possible, the items within each multisymbol belonged together by grammatical function and by semantic field ( a multisymbol might contain ten question-symbols, or prepositions, or ten symbols expressing emotions or denoting parts of the body, or foods, etc.) Each multisymbol was coloured according to

the predominant part of speech it contained. The vocabulary was organized, in gross, with the common social phrases at the top left, followed by the multisymbol of question words, then logical relations, personal pronouns, members of the family, and other symbols applying to humans; next came a series of verb multisymbols, then adjectives, prepositions, adverbs, numerals etc., and finally 15 multisymbols containing nouns of various semantic categories. Tracing from left to right across the display and from top to bottom, as though reading a printed page, the multisymbols follow roughly the most typical structure of a simple "kernel" sentence in English: a human subject, followed by a verb, and an inanimate object, with locative and temporal indicators toward the end.

Although the sequencing of the multi-symbols is well motivated, the progression spilling over from the right hand edge of one row on the tray to the left hand edge of the next may be too complex to benefit the children in reinforcing general patterns of sentence structure. However, when the 25 x 16 matrix 400 display was given to the children in May, this original lay-out was retained so as not to disorient the children just before their summer holidays, only to present them with yet another display on their return to school in September. The additional symbols range down the right-hand side of the old display, while the letters of the alphabet are strung out along the top 25 spaces, in the same position they had held before.

## 4. DEVELOPMENT OF A GRAMMAR

The most striking aspect of the children's linguistic output is its "telegraphic style", characterized by extreme brevity (often just one or two symbols per "utterance"), with a heavy preponderance of lexical words.[4] While in some situations and with some people a telegraphic sentence may be the most efficient means of conveying information, in general it results in a great deal of ambiguity which can only be cleared up by time-consuming and often frustrating guessing on the part of the interlocutor. It is in the interest of economy of space that one symbol should correspond to a number of English words, or to a

number of allomorphic variants of a single lexical item (for instance, a single symbol for "I, me, my, mine"), but this itself can lead to confusion. However, to the extent that fuller grammatical structure is used and regular syntactic patterns are followed, the person talking with the child will have a much more reliable indication of the logical relationship between the symbols, he will have to resort much less to shot-in-the-dark guesswork, and communication will be very much facilitated.

The reasons for the telegraphic style appear to be two-fold. On the one hand, some grammatical elements typical of English structure (such as the articles, or a relative particle) were either not included in the 340, or were not used as such in a regular way (as in the case of the past and future tense-markers.) And on the other hand, little guidance was being given in the structure of well-formed symbol sentences. (It had been the explicit policy of the team, before the linguist joined them, not to give specific instruction in "grammar", in order to observe the children's untutored use of symbols.)

The children in the Bliss programme are in a highly unusual, if not unique, situation with regard to their acquisition of expressive language. Firstly, their primary receptive channel is auditory, while their primary expressive medium is graphic. Secondly, they are obliged to utilize a language which no one in their environment speaks fluently (the children themselves, for instance, know the location of their symbols much better than any of the adults around them), and the language itself is in its infancy and subject to constant change. The normal child is surrounded by a community of fluent speakers who offer a vast corpus of linguistic material providing regular speech patterns for the child to model his own utterances on. The Bliss children too hear a great deal of language around them, but they might only <u>see</u> a handful of symbol sentences each day, written on the blackboard or on worksheets. Hitherto, they have not been able to see one another's symbol-speech with any ease or reliability, and no one else has used the symbols in the same way as they do, that is by pointing to the squares on the display. Whatever adult symbol usage the children

have been exposed to, this has been inconsistent, simply because there is no community of users and no one has learnt any "rules of grammar". Thirdly, as stated earlier, the most common response of others talking with the children is to read out each symbol as it is pointed to, yielding a stilted word-for-symbol translation rather than fluent grammatical speech with normal intonation.

Clearly, steps must be taken to remedy the impoverished feedback and the lack of a grammatical model in symbol usage. As a first point, the linguist suggested that anyone talking with the child should respond in a more normal fashion. So long as he made it clear that he was paying attention, he should restrain himslef from verbalizing each symbol in isolation but rather he should wait until an utterance was complete. Then he might either attempt to give a fully grammatical free translation, if necessary, or simply continue the conversation without translating audibly, or respond by action (See Appendix E.) (Note: It is realized that these rules of response are probably unsuitable with a child who is first learning to use the symbols. Here direct feedback for each symbol may well be necessary to provide positive reinforcement.)

Some consistent rules of grammar are essential. The alternatives from which to choose a grammar would appear to be:

1. to follow English structure as closely as possible.
2. to use an abbreviated or telegraphic English-like word-order.
3. to adopt the syntax of some other language.
4. to invent a totally new grammar.

For various reasons, 1. is the most attractive alternative:

the children already "know" English grammar in the receptive sense;
the people with whom they are communicating are predominantly monolingual English speakers who cannot be expected to accept or learn a totally strange grammar (at least not without severe strain;)
the children are going to be reading and typing conventional English; the more they are used to putting in the (often redundant but nevertheless grammatically necessary) function words, the better;
for many situations telegraphic style offers the most suitable and effective communication. However the children will very probably develop their own patterns of telegraphic signing, without this having to be presented to them as a model. This does not appear to be the case with a fully grammatical English style. Our aim is for the children to be fluent in a number of different styles: it is expected that, when they are a little more sophisticated, they will be able to find the appropriate level of communication for a particular person in a particular situation (See Appendix G).

A simple tense system was worked out, using symbols already available and consistent with the syntax of the English verbal auxiliaries but not allowing at this stage for as many distinctions in tense and aspect. Miss Robertson began to introduce the system to her class early in April. By the end of June, the linguist was able to provide the parents with guidelines for constructing sentences, based on formal rules following English syntax as closely as possible (Appendix H).

It is expected that instructing the children in using definite English-type structures, apart from improving communication with others, will also aid them considerably in learning to read, and provide valuable experience towards this end.

## B. THE "100" CLASS

### 1. DESIGN OF THE SYMBOLS

The same comments apply here as with the 340 group. The symbols used in the 100 display were a subset of those in the larger display and for the same reasons are well suited to their purpose. Only two of the symbols which needed to be redrawn were among the 100.

### 2. SELECTION

Since all the children in the "100" group but one have extreme difficulty in indicating a position on their trays even with the use of the electronic equipment, their symbol output is very much slower than that of the children in the other classroom. It is not reasonable in this case to expect more than one or two-word utterances, with the person being spoken to having to make the most out of these by appropriate guesswork. Apart from the problem of speed, the severe limitation on the size of the vocabulary to just one hundred symbols reduces the value of most function words to practically nil, while the need for context words is maximized.

The 100 vocabulary, then, appropriately enough, included as function words only a set of interrogatives, three symbols which might be used to expand

the vocabulary in combination with others - ("opposite", "similar to", and "part") a plural marker and possessive marker. Aside from four social expressions ("please", "I'm sorry", "hello-goodbye", "thank") and the ten digits sharing space with colours, the rest of the display was taken up with content words, again intended to cover the children's most immediate needs and experiences.

This original 100 selection was not altered during the school-year although one or two improvements could have been made. Rather, the linguist worked on increasing the vocabulary to 200 symbols, in preparation for a new display device which was presented to Silvano at the end of April. The 100 vocabulary contained both "to want" and "to need"; since these concepts overlap and hence give rise to unnecessary redundancy, the latter symbol was omitted from the 200. On the constructive side, a number of prepositions were added as well as other grammatical elements, such as the three cause markers, and symbols for "all", "more", "most". Beyond this the various categories of the content symbols (nouns, verbs, adjectives) were extended further, moving towards the complement of the 340 display.

During the summer, arrangements were made for all the children to have "200" displays for their holidays at home.

3. ARRANGEMENT

The original 100 display consisted of an electronically controlled pointer which swept across an arc containing the symbols in two rows of 50 around its perimeter. To indicate a particular symbol the pointer had to be manoeuvred by a manual switch to the appropriate position, and then the child had to specify which of the two alternatives he intended by touching one of two extra symbols, "inside" or "outside".

As with the 340 vocabulary, the 100 symbols were grouped into (5 x 2) "multisymbols" of 10 each, the members of a multisymbol belonging as far as possible, to the same semantic and functional category. The multisymbols were arranged in a similar order to those on the 340, but strictly from left to right around the arc.

When the 10 x 10 electronic display was introduced the order of the symbols was preserved, except that the multisymbols were stretched out over an entire row, and the progression from multisymbol to multisymbol ran from top to bottom rather than from left to right.

Both with the first (25 x 16) 200 display, built for Silvano, and with the later 20 x 10 model for use over the holiday, it was attempted to maintain the same general progression of multisymbols: from the phrases of greeting etc., to question words, to humans, then verbs and adjectives, the prepositions and a series of common nouns, ending with temporals. These displays do however differ from earlier versions (e.g. the 340 and 100), in that the numerals and colours are displaced from their central position to the very end. The lay-out in both cases was adapted to the way in which the indicator lights move across the displays, so there are gross differences in the spatial organization, which affects search procedure. (The 20 x 10 display is simply two 10 x 10's linked together. Originally intended as a double-faced 100 vocabulary, allowing the other children to read the symbols face on, they were adapted to hold 200 separate symbols in order to give the children a larger expressive vocabulary. Two symbols are lit up simultaneously, one on each side of the device, in the corresponding position. One can tell by the direction of his glance which one the child intends.)

## 4. GRAMMAR

The linguistic output of the children in the 100 class was predominantly "holophrastic", or in the form of a single key word expressing an entire proposition,[5] leaving it up to the interlocutor to infer from the context exactly what the child is trying to say. The reason for the single-word utterance is not the child's lack of the intellectual capacity to string words together, but is rather the extreme length of time he requires to indicate a symbol. On the original arc display, the pointer would frequently swing beyond the desired position or come to rest ambiguously between two symbol-pairs. The new illuminated devices introduced in May obviated the problem of ambiguity since only one

discrete symbol (or on the improvised 200 display, two) is lit up at any one time; the problem of overshooting has also been brought under control to some extent as the rate at which the light progresses from one symbol to the next can be controlled to suit the child's speed of response. However, the speed of output still remains the major problem. Until the speed can be greatly increased, it does not seem reasonable to expect the children to produce extended sentences with full grammatical indices. At the present time much abbreviated telegraphic style, making the best possible use of the content symbols and of the interlocutor's ability to "fill in", would seem to offer the most effective means of communication.

One exception to the rule of extreme brevity in the utterances of the "100" children resulted from the first 200 display designed for Silvano. This device had a "latching" capability whereby a symbol once selected would remain lit up, while other symbols could then be indicated and allowed to remain lit up at the same time. In this way an utterance a number of words long would be built up and presented in one go, thus relieving the severe demands on the attention and patience of the person being spoken to. As soon as the device was offered to him, Silvano was spontaneously exploiting this potential for more complete sentence-structure. In the first week of its use he produced, for instance, the symbol utterance:

"we have not good hello/goodbye school", which in its context meant something like "we did not say goodbye properly to you in the classroom" or "..... when you left school." Previously Silvano might just have said "Not good-bye"; in fact he would probably not have attempted to express such a complex proposition at all. Unfortunately Silvano's latching equipment is both cumbersome and prohibitively expensive; for use at home during the summer, Silvano has one of the non-latching double 100 displays.

While the time factor still restricts the 100 group largely to single-word utterances, Miss Norman, their teacher, was encouraged to write telegraphic style sentences on the board etc., using the symbols the children knew but

following English word order. She did this effectively, as well as making up "fill in the blank" exercises for them which gives training in word-order without putting a strain on the children's productive limitations.

OBJECTIVES FOR THE FUTURE

Immediate (August-September 1973)

1. Development of an expanded vocabulary

A further expanded vocabulary is to be designed for the children currently working with 400 symbols. The new display will hold between 500 and 600 symbols, and will be based on a width of 32 units in accordance with the technological requirements from the Cerebral Palsy Instrumentation Group in Wisconsin who are cooperating with us, and in consultation with the Rehabilitation Engineering team member.

(At some point, there must be an optimum size of the vocabulary that can be presented in a single array, and this may well differ from child to child. We must be careful that the size of a display does not result in its becoming too unwieldy or disorienting either for the children, at the expressive end, or for adults at the receptive end of the communicative process. To augment his expressive vocabulary beyond the items immediately accessible, the symbol-user will have to rely on spelling, and on combining-strategies.)

2. Re-organization of the symbol displays

It is hoped to encourage more consistent and more adequate syntax by making the sentence-like progression of the various symbol categories more overt. This will be done by ordering the categories in columns from right to left across the displays (following the general structure of the Fitzgerald Key, a word-arrangement designed for teaching language skills to deaf children, and adopted by McDonald and his associates for non-verbal cerebral palsied children at the Home of The Merciful Saviour For Crippled Children Clinic in Philadelphia.) When a child is pointing out a sentence, he should thus be following to a greater extent the left-to-right order of the written language he is exposed to.

The linguist will attempt to arrange all the vocabularies (100, 200, 400, etc.) in such a way that the categories retain the same relative positions.

The present colour-coding system (yellow and orange for nouns, greens for verbs, blues for adjectives, otherwise white) will be retained, since this helps to break up the display visually, facilitates the location of individual symbols, and makes the whole more attractive to the eye.

3. A detailed linguistic analysis of the circle records for the past year.

LONG-TERM AND CONTINUOUS OBJECTIVES (up to and beyond February, 1974)

1. Further refinement of the grammar, to bring it closer to the structure of English.
2. Instruction of teachers and parents

It is most important that those in close contact with the children should understand the symbols and their use, and should be able to offer a consistent model of symbol usage themselves.

3. Preparation of reading materials (stories, etc.) in symbols providing models of grammatical symbol sentences, as well as giving the children stimulating work in their own medium of expression, and advancing towards reading conventional written English.

4. A thorough review of pertinent literature. Spending just three hours per week at the University of Toronto Library, the linguist was not able to complete a thorough-going survey of relevant literature. Published materials dealing directly with the problem of providing language for children without speech are scanty; but related matters such as the normal acquisition of syntax, the general development and function of language, other artificial language systems, graphic systems of representing language, reading, the sign language of the deaf, etc., present a wide area of research. More time will have to be devoted to this

important aspect in the future.

5. Development of a method for assessing a child's expressive competence with symbols.

6. Continued observation and recording of the children's symbol usage.

At this stage, all the team members should be careful not simply to accept the system uncritically; on the contrary, they should be alert to any deficiencies or possible improvements, and these points should be brought up for discussion. The linguist should invite criticism and comment from parents and teachers (and anyone else in contact with the children) in order to be aware of the problems encountered by others.

The children must be observed to see if they are making progress in the expected direction. If they are not, or if inadequacies become apparent, the cause must be found and solutions sought and implemented.

The full potential of symbol-communication for people without speech would be best apparent with adults who have been using the system themselves for some time. A more mature person than a child of 7 to 9 years would be more able to put himself in the shoes of others trying to interpret a symbol-sentence, and he could make better use of the vocabulary, anticipating ambiguities, giving extra clues, and adjusting himself to an appropriate style of communication. At the other end of the scale, it is very important to offer such cerebral-palsied children an effective means of expression at as young an age as possible.

Different vocabularies and grammars will be needed for different age-groups.

The potential of symbols as an aid in remedying other kinds of language-impairment needs to be explored.

For these reasons continuous long-term participation of a linguist in

the programme is required.

The greatest obstacle in the way of communication by means of Bliss' symbols appears to be the ingrained resistance from the average person to any such unconventional form of language, which stems perhaps from the widespread "linguo-centricity" of the English-speaker - "why can't they just use ordinary English?" - his diffidence about learning a second language, and the stigma attached to anything conspicuously different. Since the linguist has come to the conviction that the symbols do indeed offer the most effective means of expression available for the children currently in the programme, it should also be part of his job to attempt to break down this resistance.

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# BLISS PROJECT EDUCATIONAL PROGRAMME

## FOR THE 1972-73 SCHOOL YEAR

> "It is chiefly through language that a teacher can become acquainted with a child's mind. She may infer what he thinks and feels from his play activities, but his actual formulations of thoughts and feelings in language is a major step toward clarification of ideas and mutual understanding." (1)

## OBJECTIVES

To have two primary classrooms in which Bliss Symbols would be used as an alternate to speech and in which symbol learning and usage would be related to the child's total learning programme.

(1) In the "100" class, to teach and use the 100 symbol vocabulary. (Appendix A)

(2) In the "340" class

- to continue using the 340 symbol vocabulary with 2 children (Appendix B)
- to transfer 3 new children to the 340 symbol vocabulary directly, following their learning of the 30 introductory symbols. (See appendix C).
- to investigate additional symbols for the 340 symbol vocabulary
- to explore alternate ways of sequencing the symbols when making a statement, in order to clarify meaning.

. To provide information to the linguist for the development of revised symbol arrangements.

. To develop a teaching programme which would integrate symbols with reading and mathematics instruction.

. To acquire information from which a methodology of symbol presentation could be developed.

. To develop teaching equipment and teaching aids for use in the classroom.

. To provide a setting in which the scope of symbol usage and the influence of symbols upon the qualitative aspect of language and cognitive development could be explored.

. To observe the effect of symbol use upon the child's total performance and upon his school programme.

. To initiate the development of informal assessment procedures for recording progress in expressive language as demonstrated through symbol use in the class setting.

. To clinically assess symbol displays and interface prototypes.

## PROGRAMME ACTUALIZATION

1. Two primary classes were opened in September 1972, each made up of five children. One of the children was transferred back to his public school setting in February (See Appendix D); the others remained throughout the year. The original intention had been for 2 classes of 6 children, but it was impossible to make arrangements for the final 2 students for various reasons - ineligibility (based on screening assessment), incompatibility (grade level), lack of parental permission, distance from O.C.C.C. No suitable candidates were available by November 30, and it was decided to be inappropriate to admit a student into the programme after this date.

The children were divided primarily on the basis of hand skill. Those who could point and who were ready for a quickly-paced symbol programme entered the 340 class. The children who required electric or electronic aids or who would benefit from a slower-paced programme entered the "100 class".

Responsibility for the "340" class was shared by the Supervisor, teaching mornings, and Sherran Robertson, teaching afternoons. Following the mid-winter holiday, Sherran Robertson assumed responsibility for the full-day programme and the Supervisor role became full-time. The "100 class" was taught by Marcia Norman all year. Elva Taylor was teacher-aide full time from October to June, dividing her time between the two classes. Over 25 Volunteers assisted throughout the week in the classrooms, and 2 grade nine students visited each day from 9 to 10.00 A.M.

2. CLASSROOMS

(1) In the "100" class, the use of symbols was limited to specific periods in the day. Early in the year when the electric motor-driven pointer displays were in use, only one short period a day was possible, due to the time and personnel required to attach the displays, the restrictions which the displays imposed upon the children's activities (only functional when attached to wheelchair), and due to the small number of symbols to which a child could point accurately due to gross targetting ability. In the spring, when the

new symbol displays were introduced, (see sections 4,6,7,8 Engineering Report, Execution of Proposals), the period of symbol use was extended to 45-60 minute periods twice a day. By this time, the displays were easier to make operational; the children's ability to attend had increased; the symbol vocabulary was larger and thus more functional; the need for gross motor and play activities had lessened; the children were ready for learning activities which could be related to symbol use.

Progress in the "100" class was strongly affected by availability of functioning equipment. For 3 of the 5 children, needs surpassed rehabilitation engineering and occupational therapy personnel time. Development of new interfaces and prototype symbol displays competed with the production of displays for immediate classroom use in the repairing of classroom models. (See engineering report re details.) Children in the "100" class could not be provided with equipment quickly enough to allow them to progress according to their learning capabilities, rather they learned new symbols when displays could be made available to them.

In September, Ann knew 30 introductory symbols plus 8 additional symbols. Her full symbol vocabulary had never been successfully displayed in a manner which she was able to independently and accurately operate, due to the difficulty of interface. She began using an electric-motor drive pointer September 30th., and worked throughout the fall with several interfaces using the 30 introductory symbols and 8 additional symbols. In the winter term 18 extra symbols were added to her tray. In March when targetting was sufficiently accurate, the 100 symbol display was introduced on the electric motor-driven pointer display. In May the electronic 100 display was introduced with the reversing switch allowing Ann to move the lights in 4 directions. (See Engineering report Section 3.) At year end, Ann knew the locations of the 100 symbols on her display, but was timed as requiring 20 minutes to locate 8 symbols in a test situation.

David, at the beginning of the school year, knew approximately 60 symbols and was able to use them in simple sentence form. He manually indicated a symbol by "fist-pointing" first to a multi-symbol and then to a colour code which indicated the individual symbol. He transferred to the electric motor-driven pointer display containing the 30 introductory symbols in mid-October. His attention span was short during the fall term, but improved during the winter. In March, the 100 symbol display was added to the electric motor-driven pointer and David adapted well to locating the symbol he wanted on the large display. In April the 144 Electro-mechanical display was given to David (with 100 symbols displayed) and he quickly adjusted to symbols being indicated by a light rather than by a pointer. A new pad interface proved very successful for David and he used it throughout May and June most effectively. (See Occupational Therapy report.) David used a restricted number of symbols accurately in class. By June he was beginning to use several symbols to relate incidents. In a test situation, David was able to locate correctly 50% of the symbols selected at random from the 100 vocabulary. He was able to initiate topics and answer oral questions; he was unable to answer questions from a visual symbol presentation.

Scott, Darlene, and Silvano were introduced to symbols in September 1972.

In September and October Silvano pointed grossly to the 30 introductory symbols and to additional symbols which were added. He received the electric motor-driven pointer display in mid November and his hand control was sufficient to enable him to transfer immediately to the 100 symbol display. By December, he was using approximately 75 symbols, as well as the alphabet for indicating initial consonants. In early May, the 200 electronic display became operational for him and he transferred easily to the enlarged vocabulary. He was [illegible] in June. In locating symbols (from the 200 display), he achieved over [illegible] accuracy, and was able to answer questions presented in symbols. In class he sequenced many symbols and in conjuntion with the alphabet for initial consonant clues wrote stories and riddles. He began to share activities with the more advanced children in the "340" class and a vocabulary equivalent to theirs would have been given to Silvano had an electronic display [illegible] the number of symbols.

Darlene worked with the 30 introductory symbols augmented by theme and seasonal symbols on the electric motor-driven pointer display, from September until the 100 electronic symbol display was ready in May. The extreme difficulty of developing an adequate interface for Darlene greatly retarded her use of symbols. She was fortunate in having an increasing capability for speaking in school; this, she used in conjunction with the symbols. In June, in a test situation, Darlene knew 80% the symbols selected at random from the 100 display. The time taken to locate individual symbols ranged from 1 minute 15 seconds to 4 minutes 32 seconds.

Scott was able to point using his finger, but due to his lack of motivation (being the only "pointer" in an equipment-oriented class), he was given an electric motor-driven pointer in mid November. He moved from the introductory augmented 30-symbol-vocabulary to a 100 symbol vocabulary, in March continuing to utilize the motor-driven pointer. In May, when the new electronic displays were coming into classroom, Scott was transferred back to pointing with his finger and continued with 100 symbols. In a test situation Scott located 50% of the symbols correctly. In the class situation he appeared to be utilizing closer to 70% of the symbols, but often hunted a long time to locate a symbol. His concentration and interest level was that of Kindergarten level. He used gesture very effectively as a regular adjunct to his symbol communication.

(2) In the "340" class, symbols were utilized thoughout the day as a functional mode of communication. For Greg, symbols complemented and supported his increasing use of speech. For Kari, Joey and John, symbols served as a substitute for speech, accompanied by vocalization with growing frequency. For Steven, who remained in the programme from September to February, symbols were used only when requested by the adult. Speech and gesture remained his dominant method of communication.

Rapid progress was made in the acquistion of symbols by 2 of the 3 new children.

> John learned 36 symbols in the first 2 weeks of school, and continued to learn from 3 to 5 new symbols daily.
>
> Joey entered class in early October following surgery. He displayed general weakness and apathy toward learning for several weeks. By the end of October, in spite of his poor physical condition, he had learned the 30 introductory symbols as well as the theme symbols for Halloween.
>
> By the end of December, both John and Joey, were using the "340" display, and knew a sufficient number of the symbols to participate fully in discussion with Kari and Greg. The estimated symbol vocabulary for John was 240 symbols, for Joey 180.

Steven was able to learn the meaning - symbol relationship for approximately 50 symbols between September and January, but he had difficulty locating the symbols on the 340 symbol display and resisted using the symbols for communicating. His estimated vocabulary in December was 40 symbols. (For details see Final report, Appendix D.)

Kari and Greg began the school year, conversant with the 340 symbol display, except for the prepositions, some of the adverbs, and the conjunctions. Kari used symbols spontaneously and with English order. Greg tended towards single symbols and telegraphic output. By December, the estimated symbol vocabulary for Greg was 360 symbols, for Kari 380 symbols.

During the fall term, the following supplementary symbols were added to the 340 display (for exploring children's use of the symbols.)

(1) pronoun particle to be used in conjunction with verbs and adjectives, e.g. "person who", "place where"

(2) verb "to be"

(3) past and future tense indicators

(4) seasons, days of week, family members

(5) "similar to" symbol combined with senses e.g. "smells like", "feels like"

(6) theme and seasonal symbols created by children and teachers

(7) exclamatory symbols, "wow" , "yuck" (darn!)

(8) 10 symbols for key words in Stott reading games

(9) alphabet as arranged on typewriter

In February attention was focussed upon establishing a more consistent and easily understood order to symbol output, and following the advice of the linguist, English sentence structure was encouraged in the winter and spring term. (See Linguist's report and Appendix E).

In May a temporary 400 symbol vocabulary was introduced. Three minor changes were made in 340 vocabulary and 46 symbols were added. The children adapted to its use quickly, and extended their vocabulary to include many of the new symbols well within the first month of its use. Instructions which accompanied this vocabulary are in Appendix F.

In this class symbols were used in all phases of the academic programme. The children had duplicate symbol displays for use at home, and took their displays to lunch, to Boys' Club, to the noon-hour activity programme, and on excursions.

2. Information for Linguist

The linguist visited and worked frequently in the clasroom. He met individually with the children and observed "circles". Videotapes of classroom group discussions were made to which he could refer. The May temporary 400 vocabulary was arranged under his supervision. Methods of using and responding to the children's use of symbols suggested by the linguist were tried by the teachers. See Appendix E. Regular meetings were held with the teachers and project supervisor.

3. Integration of Symbols with Reading & Mathematics

All the children were at either the pre-reading, reading readiness or primary reading stage. The emphasis of their instructional programme was directed toward symbol usage; however, it was felt that this concentration upon symbols was contributing toward the reading programme in a unique way. For

a description of the manner in which symbol instruction was viewed as being related to reading, see Educational Appendix.

The following reading activities were introduced during the year:

Reading Activities

- continuous opportunities to use symbols for active communication at many levels - with peers (through an adult intermediary) and with adults (well known persons, and strangers); the language experience foundation upon which all reading instruction must build.

- development of comprehension skills through symbol sentence completion and through the unscrambling of compound symbols and symbol sentences.

- exploring time -place relationships through classifying with symbols.

- utilizing symbols in conjunction with Stott programmed reading games; symbols were used in place of pictures and as substitute for saying words.

- utilization of symbols in initial consonant and rhyme word recognition activities, as the child's mode of response.

- visual discrimination, matching, and sequencing tasks using symbols.

- building of sight vocabularies through matching word with symbol.

- written symbols were used for tasks and for questions in assignments which required a typed response or indication of the correct answer by marking.

- the composing and reading of symbol stories and letters was a regular component of the reading programme.

When a child points to symbols, he is gaining experience in expressive language, an essential reading ingredient; when he interprets symbols presented by anyone else, he is having practice in a form of reading. By using the ideographic and pictorial Bliss symbols, the child is not only developing his expressive language capability, he is learning to read. Due to the representational manner in which the Bliss symbols portray meaning, the child is having his first experiences with reading in a symbol mode which makes no letter-sound association demands upon him, (see Linguistic report), thus greatly simplifying his task.

The major emphasis was given to symbol instruction and symbol use, for the primary goal of the programme for these children was to provide a means of communication; nonetheless the activities listed were seen as contributing directly to an early reading programme. Because none of the children were ready for a more advanced reading level, we were unable to explore the relationship of symbols with reading for the more advanced primary reader.

Mathematics instruction was limited to short group lessons in counting, grouping, relationship concepts, along with individualized work with time, number concepts, calendar, and number facts. Silent finger counting (by pointing) and secret answer-giving were two symbol number activities which had not been anticipated! The use of symbols for before and after, big, little, equal, were used. Due to time limitations, a low priority had to be given to mathematics activities.

4. Methodology

Throughout the last two terms of the school year, statements regarding levels of symbol use were organized and instructions for parents, volunteers and teachers were written by the linguist and the supervisor-teacher. (See Appendices E,F,G,H). These statements along with sections of the 1972 brochure will provide the basis for a methodology.

5. Teaching Aids

Many ideas for teaching equipment and teaching aids were generated by the three teachers involved in the programme. Limited time available from technical personnel prevented many of the ideas from being implemented.

(1) One large project which was accomplished through many hours of work from volunteers, parents and teacher-aids, was the preparation of 12 sets of the complete symbol vocabulary into 2 x 2 slide frames. Storage of symbols in a systematic way is now easily maintained, and many symbol activities can be created in which the children manipulate and order the symbols. Plastic symbol frames were produced in the Rehabilitation Engineering Department for easy manipulation of the symbols by the "340" class children. Completion of these symbol teaching aids was achieved in May, so time to explore their possibilities was limited. During the short time which they were available, they proved to offer useful learning activities.

(2) Large symbol templates were made which allowed the children to trace symbol shapes. These proved to be too cumbersome for the children to operate independently.

(3) Stott Programmed Reading games were made by the teacher in which symbols were substituted for the original pictures.

6. Exploring Language and Cognitive Development

The Speech Pathologist and the Psychology Department Team Member, organized regular recorded observations by volunteers of the type of communication used by the children. Language assessments were made at the beginning and end of the school year. Cognitive development was explored through the administration of several tests. (See report of Psychology Team Member and Speech Pathologist.)

7. Symbols and School Programme

The ability to use symbols dramatically changed the school programme which was provided for these children. Without symbols, many of the children would have been placed in schools for Retarded with little attention given to academic skills; the others would have been placed in slow stream classes for physically-handicapped children, where reading, mathematics, and other subjects would have had to be presented to them with very limited opportunity for active independent participation on the child's part, and with slow progress the result.

Through their growing ability to use symbols the children displayed their capabilities and helped teachers establish more appropriate objectives; areas of weakness became apparent, allowing teachers to programme remedial programmes; the children were developing a mode of expressive communication which gave them the potential for independent thinking, decision making, and assumption of responsibility. Expressed needs and developmental needs became more apparent. Social immaturity, limited ability to relate with peers, egocentric tendencies, poor ability in problem solving, weakness in attending to auditory detail, inability to role play, were some of the areas of development which become apparent both through teacher observation and through psychological and language assessment.

We discovered that the children had the potential to learn, but also that they were not ready for a formal academic programme. Realizing that

"skills are built on the fullness of childhood, childhood is not built on skills" (2), programmes were planned to allow the children extensive opportunities to participate in interpersonal activities heretofore denied them. Opportunities to relate with Grade 9 students, volunteers, O.C.C.C. staff members, were planned into the learning programme. Activities and experiences were provided to help fill in the gaps in development and understanding.

As a result, not only was the programme changed, the children changed. More vocalization, greater determination to be heard, growing interest in the environment, the desire to inter-act with peers, reduced difficulty in being understood, increased attention span and alertness - all become more and more apparent. (See Psychology report.) A greater awareness of individual differences became possible and as individual personalities emerged, individualized programming became more refined.

The entire team was able to observe changes and plan their involvement with the children more appropriately. As well, the children's active interest in symbol development enabled them to exert an influence on vocabulary selection and symbol strategy development.

A request was made for comments from parents as to the effect of symbols upon their child's life at home. The following are a series of quotes, which, better than any remarks by Team members, express the dramatic changes occurring:

-"since he has been on symbols his speech has become much clearer and he will attempt to say everything, knowing that if we don't understand he can back it up with symbols. He was trying to tell me he had an argument with Joey. He said argument a few times, but I couldn't catch it, so then with symbols he said 'fight with words'".

-"more out-going"

-"loves to be able to ask questions"

-"he is a different boy; he now has a personality"

-"knowledge has increased comsiderably by being able to ask questions and get answers"

-"has left behind the baby-like status and by being able to convey questions, feelings, and opinions, has become an almost fully participating member (of family) - as much as her immobility will allow."

- "able to tell that she is angry instead of demontrating it."
- "tremendous psychological boost. For the first time she could do something her brother and sister couldn't do"
- "more motivated to learn than ever before"
- "feeling of self-importance"
- "expected and had to have her fair share of air-time (in family discussion)"
- "in speaking with symbols she seems to have touched on so many of the modes of childhood speech: being silly - and saucy - and stubborn - sometimes almost rude, and often surprising us with her intuitiveness"
- "she gives advice (like telling me to put water in a depleted ketchup bottle)"

These observations were reinforced daily by the teachers and adults relating with the children. The classroom was alive with activility-initiating, independent - thinking, determined young people. Their passivity, and restless resignation are but memories in the minds of those who knew the children prior to their extended communication capability. Even the children who were limited to the 100 symbol vocabulary up until June, demonstrated self-confidence, determination and perseverence in making their individual opinions and wishes understood.

8. Educational Symbol Assessment

(a) Group Discussion Assessment

To assist in the development of assessment procedures which could record each child's progress in symbol use in class, videotapes of group discussion were made in March and in May, along with a written recording of each child's symbol, alphabetical, vocal, and gesture output. Individual tapes of children "talking" with a teacher were made in October and February. Although the tapes of individual conversations can be used as demonstration for teaching purposes, the format was not standardized, and their value for comparative purposes is thus limited. Much more experience, study and time will be necessary in order to develop methods of objectively evaluating this free symbol conversation.

An attempt was made to begin to categorize the type and quality of symbol response given in group discussion. The categories used were developed

from the types of responses being given. Although the measuring instrument at this stage is rough, the records do show the general characteristics of each child's method of responding and indicate the level of symbol output which prevails in group discussion.

From the 3 "340" group discussions recorded and summarized in Chart A, the consistently heavy use of single symbols and telegraphic sentences can be seen. English word order, but with no tense indicator, is beginning to appear with 2 children; the same two children are beginning to create their own symbols. Question-asking, requests, use of numerals, "opposite", "similar to", spelling, punctuation, use of consonants are used infrequently by the group as a whole. The specific syntactic skills introduced during the last 3 months of school (use of articles, and English sentence form utilizing the tense indicator) do not appear in the 3 recorded circle dialogues. The results obtained from the circle records do not coincide with the impressions gained from conversations with individual children outside circle time, where questions and requests play a more prominent role, and the use of "opposite" and "similar to", and spelling seem to be more regular. This would make the above circle records not appear to be a valid representation of the children's communication as a whole, but it does offer a beginning in recording their output. Until individual conversations and a larger sample of circle dialogue can be accurately recorded and analyzed, we will not have a true indication of symbol use.

In the category <u>use of speech</u> it can be seen that two boys are using speech to communicate. Greg, in one circle discussion, makes more frequent use of speech than of symbols. (Only speech which is used to communicate is recorded. Vocalizations which could not be interpreted are not recorded for this study. An increase in non-interpretable vocalization was noted however, and is alluded to in Psychology report.)

The recording of group discussion in the "100" class proved very difficult. Due to the slowness of response, the teacher had to participate in several conversations at one time. As well, in those discussions which

## CIRCLE DISCUSSIONS - CHART A

| | KARI | | | GREG | | | JOHN | | | JOEY | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MAY 10 | APR. 24 | JUNE 19 | MAY 10 | APR. 24 | JUNE 19 | MAY 10 | APR. 24 | JUNE 19 | MAY 10 | APR. 24 | JUNE 19 |
| SINGLE SYMBOL | 3 | 3 | 2 | 3 | 6 | 2 | 2 | 3 | 6 | 3 | absent | 5 |
| TELEGRAPHIC SENTENCE | 5 | 5 | 1 | 3 | 5 | | 2 | 7 | 7 | 3 | | 10 |
| SENTENCE MINUS TENSE | | 4 | | | | | | 2 | 3 | 1 | | |
| QUESTION | | | | 3 | | | | | | | | 1 |
| REQUEST | | | | | | | | | | 1 | | |
| ENGLISH SENTENCE FORM WITH TENSE INDICATOR | | | | | | | | | | | | |
| GESTURE | | | | | | | | | | | | |
| SINGLE WORD SPOKEN | | 1 | | 1 | 2 | 3 | | 4 | | | | |
| SINGLE SYMBOL ACCOMPANIED BY WORD SPOKEN | | | | | | 4 | | | | | | |
| 2 WORD SENTENCE OR MORE SPOKEN | | | | | | 2 | | 1 | | | | |
| CREATING COMPOUND SYMBOL | 2 | | | | | | 3 | | | | | |
| USE OF  | | | | | | | | | 1 | | | |
| USE OF NUMERALS | | | | | 1 | | | 1 | 1 | | | |
| USE OF "OPPOSITE" | | | | | | 1 | | | 1 | | | |
| USE OF "SIMILAR TO" | | | | | | | | | 1 | | | |
| USE OF ARTICLES | | | | | | | | | | | | |
| USE OF PREPOSITIONS | | | | | | | | | | | | |
| USE OF PUNCTUATION | | | | 1 | | | | | | | | |
| USE OF CONSONANT WITH SYMBOL OR ALONE | | | | | 1 | 1 | | | 3 | | | |
| SPELLING | | 3 | | | 2 | 1 | | 1 | | | | |
| DESCRIBING OWN FEELINGS * | | | | 1 | | 1 | | | 2 | 2 | | 2 |
| INNOVATIVE USE OF SYMBOLS | | | | | | | | | | | | |
| TOTAL | 10 | 16 | 3 | 11 | 17 | 14 | 7 | 19 | 25 | 8 | | 16 |

*These figures are not included in TOTAL

## CIRCLE DISCUSSIONS - CHART B

| | SILVANO | | | DAVID | | | SCOTT | | | ANN * | | | DARLENE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APR. 19 | APR. 26 ** | JUNE 14 | APR. 19 | APR. 26 | JUNE 14 | APR. 19 | APR. 26 | JUNE 14 | APR. 19 | APR. 26 | JUNE 14 | APR. 19 | APR. 26 | JUNE 14 |
| SINGLE SYMBOL | 5 | 1 | absent | 6 | 5 | 10 | 12 | 8 | 19 | 5 | 6 | 3 | 3 | 3 | 2 |
| TELEGRAPHIC SENTENCE | 2 | | | | 3 | 1 | | 6 | 3 | | 1 | 1 | | | |
| SENTENCE MINUS TENSE INDICATOR | | | | | | | | | | | | | | | |
| QUESTION | | | | | | | | | 2 | | | | | | |
| REQUEST | | | | | | | | | | | | | | | |
| ENGLISH SENTENCE WITH TENSE | | | | | | | | | | | | | | | |
| GESTURE | 10 | 6 | | 1 | 6 | 6 | 9 | 3 | 14 | 7 | 5 | | 1 | 2 | |
| SINGLE WORD SPOKEN | | | | 1 | | | | | | | | | 2 | 3 | |
| SINGLE SYMBOL ACCOMPANIED BY WORD SPOKEN | | | | | | | | | 4 | | | | | | |
| 2 WORD SENTENCE OR MORE SPOKEN | | | | | | | | | | | | | | | 1 |
| | | | | | | | | | | | | | | | |
| USE OF CONSONANT WITH SYMBOL OR ALONE | 4 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| TOTAL | 21 | 7 | | 8 | 14 | 17 | 21 | 17 | 42 | 12 | 12 | 4 | 6 | 8 | 3 |

* Sharing Tray
** No Tray - used David's

| TESTS | JOEY | | GRETA | | KARL | | JOHN | | SILVANO | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Jan. | June | Jan. | June | Jan. | June | Jan. | June | Jan. | June |
| 1. Scrambled Symbols | 1/8 | 0/2 | 5/8 | 1/8 | 4/8 | 6/8 | 4/8 | 0/8 | | - |
| 2. Short Term Memory from visual presentation | - | 2/3 | 10/ | 3/10 | 3/10 | 4/10 | 8/10 | - | | 3/7 |
| 3. Learning Symbols from verbal presentation | - | 24/25 | 19/25 | 20/25 | 23/25 | 21/25 | 18/25 | 20/25 | | 15/16 200 displ |
| 4. Locating novel symbols (removed from tray) from verbal presentation | - | 6/8 | - | 33/25 | - | 25/25 | - | 1/4 | | - |
| 5. Word Recognition | - | - | 8/19 | 9/19 | 8/19 | 12/19 | - | 16/19 | | - |
| 6. Question Answering from visual presentation | - | 3/5 | 4/5 | 5/5 | 4/5 | 5/5 | - | 4/5 | | 4/4 |
| 7. Reading of sight words (through indicating correct symbol with word covered) | - | - | - | - | - | 17/20 | - | 11/20 | | - |
| GENERAL OBSERVATIONS | many appropriate comments during tests. Joey gave frequent requests to stop on tests 1,2,4. Tests were hastened due to his uneasiness in working with words | | in doing tests felt "lonely" without symbols on tray; tests related by location not by word structure, in test 6, more complete answers given in June | | enjoyed working with words (with symbols covered), test 4, and 7 | | John's attitude was very negative to Test 4. Test was not continued | | immediate response to stimulu Time taken in interracting with symbol display through joy-stick | |

Volunteers were not available to give all the tests to each child. Selection was based upon diagnostic need.

CHART D

100 CLASS

June, Locating Symbols
100 Vocabulary

| | |
|---|---|
| [illegible]n | 8/8 ; 20 minutes; highly motivated; tired upon completion of 8 items. |
| [illegible]ott | 8/16; pointing; required play situation in order to concentrate upon task; 20 minutes not motivated to co-operate in test situation |
| [illegible]avia | 6/12; 12 minutes; did not locate symbols which had not been used regularly in class. |
| Darlene | 13/16; to locate individual symbols, range in time from 1 min. 15 sec. to 4 min. 32 sec. highly motivated to persevere. |

were recorded, a tray had to be shared, and in one "circle", Silvano had to use gesture solely, because his tray was being repaired. Nonetheless, this serves to give a picture of the children's actual functioning, for equipment repairs and shortages affected their communication programme throughout the year.

From comparing Chart A and B, the difference between the "100" "circle" and "340" "circle" can be observed. In the "100" class, the "gesture" category, not utilized during the 3 "340" recordings, ranks nearly as high in total as the use of single symbols. The beginning of telegraphic sentences is evident for all but one child, who utilizes speech in conjunction with single symbols. It is hoped that the results obtained and reported in Charts A & B can serve as background data for the development of more refined categories next year, as as a base line for further assessment of group discussions.

(b) Individual Assessment

Individual assessments directed toward the examination of the "340" children's symbol knowledge were made in January and June. Skills tested were:

(1) recognition of scrambled symbols
(2) short term memory from visual presentation
(3) ability to locate symbols
(4) ability to locate words
(5) word recognition
(6) ability to answer questions from visual presentation

The children in the "100" class were only tested for ability to locate symbols.

The results of these teacher-made informal tests are shown in Charts C an Due to time limitations, it was impossible to give all tests to all the children. These tests can only give a general indication of strengths and weaknesses; nonetheless they offer a diagnostic tool and offer suggestions for more refined testing tools next year. During the course of testing, the unique quality and style of each child's symbol use was very evident, and ideas for better evaluation procedures were generated. It is felt that more attention should be given next year to the assessment of the quality of each child's symbol use. Monroe's picture interpretation language assessment provides one possible approach. Adaptations of the "levels of expressiveness", may provide useful scales. (3)

9. Assessing Symbol Displays

Through the use of several prototypes of symbol displays and interfaces throughout the child's school day and at home, many types of equipment were assessed as to their effectiveness in the variety of situations required. (See Engineering and Occupational Therapy report).

Role of Educator

The role of the educator on the Bliss Team was very diversified. Responsibilities included:

- supervision of programme
- half time classroom teaching until March
- co-ordination of educational needs with services from other departments
- organization of Team meetings
- preparation of reports
- correspondence with Charles K. Bliss
- educational assessment of children's symbol progress
- organization of videotaping and recording of circles
- organization of Teacher meeting
- supervision of volunteers whose activities included: preparation of teaching aids, videotaping, teaching symbols to children not included in Bliss project, symbol distribution
- organizing training for classroom volunteers
- planning of 2 workshops attended by 55 persons
- correspondence with persons inquiring about programme (over 400), and with symbol users (following workshop) 18 centres; 37 children whose names have been sent; 6 Centres in planning stage
- brochure collating and distribution
- co-ordinating planning of future programme and equipment; liaison with other Centres which this involves
- selection of new staff
- participation in O.C.C.C. Communication Assessment Team and planning programme for children referred for symbol instruction
- presentation of several addresses regarding the O.C.C.C. Bliss programme
- a paper written and presented in conjunction with Barbara Kates, Psychology Team member; C.E.C. International Convention, Dallas, April 1973
- team presentation to O.C.C.C. staff February 1973
- a lecture at Columbia University Teachers College to graduate students with M. Izzard
- 2 addresses to O.S.C.C. district nurses
- an address at the Rehabilitation Council for the Disabled Symposium on Rehabilitation November 1972

- 3 lectures for Ministry of Education Special Education Courses (2 in conjunction with M. Izzard Project Director
- 2 lectures with Barbara Kates, to Mental Retardation Centre and OISE

Recommendations for 1973-74

1. In order to assess the revised symbol arrangements being developed by the linguist, new children should be included in the programme.
2. To investigate the acquisition of symbols at an earlier age level, children at the Kindergarten and Junior Kindergarten should be included in the selection.
3. In order to explore the relationship of symbols with words for expressive communication when the child becomes a proficient reader at the primary level, the children presently in the programme should remain.
4. More time is required from Psychology, Speech Pathology, Occupational Therapy, as well as a continuation of the linguist's involvement as a team member - full time until August 1974 to evaluate the revised vocabularies and their use with an extended age range, followed by part-time consultant services. (See Team members reports)
5. A larger budget is needed for the Rehabilitation Engineering contribution to the Bliss Project. In order to satisfy the needs of (1) research, and prototype - development, (2) production and maintenance of symbol displays, (3) development of new inter-faces, (4) exploration of new body positions through seating innovation, (5) development of toys and teaching aids for the young activity-oriented symbol learner, (6) exploration of possibilities for symbol representation through use of computors, more engineering and technical staff time is needed, as well as a budget for travelling expenses and for parts.
6. The involvement of U.C.C. Grade 9 students proved to be most satisfactory. A continuation of their daily visits is recommended.

7. In order that videotaping will become a regular component of the programme, with well established routines, it is recommended that tapes be made weekly, and that a new tripod and a new lens be purchased which will allow greater flexibility in the activities recorded.

8. To avoid having adults, other than teacher and volunteer, in the classroom too frequently, it is recommended that videotape be used as an observation tool.

9. Further attention should be given to development of methods of objectively evaluating free symbol conversation. More time should be allocated for educational testing as well as to developing improved methods of recording group discussion.

10. An increase in clerical staff time from 2 half days to 5 half days per week is recommended, in order to meet the needs of the expanded O.C.C.C. Bliss programme and to allow us to benefit from the "in-put" now possible from the many symbol programmes beginning throughout Ontario and in the United States. Correspondence with these programmes can provide much useful information regarding symbol instruction, vocabulary development, and equipment possibilities.

11. In keeping with the recommendations in the linguist's report, training of teachers, volunteers, and parents should be extended so that more consistent models of symbol use will be presented to the children. To supplement this, work on a formal methodology should be continued.

SUMMARY

This report attempts to record in written form the educational symbol programme of the 1972-73 school year. It is realized that the videotape recordings, and slides give a more vivid representation of the programme, and that words and charts fail to communicate many of the changes that have occurred. It is hoped that the rudimentary form of record-keeping which was initiated this year will be developed and refined so that the children's development can be effectively documented and reported. At the present stage of our programme, I feel very much in accord with a statement by J. Tizard, Professor of Child Development, University of London Institute of Education, "We have yet to find the best way to enable teachers and therapists not only to present their findings, but to communicate the quality of their experience, which is often much more significant than any bare statement of results can indicate." (4)

We hope, through our continued efforts, to find a way!

Shirley McNaughton, B.A.
Supervisor, Bliss Project

August 3, 1973

# EDUCATIONAL APPENDIX

## SYMBOLS AND READING

To appreciate the correlation between symbols and reading, it is necessary to first outline the framework from which the supervisor and teachers viewed:

(A) the role played by expressive language in learning to read, and

(B) the implications which symbol use has with relation to the reading process.

### The Role of Expressive Language

Expressive language is the medium through which many of the reading skills are acquired. In the learning of phonic skills, the ability to repeat words and reflect upon the sounds actively being produced is of great importance.

In teaching children who are capable of expressive language, to discriminate and identify beginning sounds, ending sounds, (rhymes), vowel sounds, the teacher can build on a wealth of experience gained as children play with sound.

e.g. 5 year 10 month Jim, digging in loose dirt:

"I'm going to dig with this shovel. Are you going to dig with that one? I'm not going to dig with this fork. I'll dig with this one. I'll dig - da - dee - da - dee - da (rhythmical singing.) Can I dig with this one?"

"Hey, give me the moth, please,
John (5 year 9 months): Please, sneeze, bees,
John and Jim: (Alternating) Peas, dees, see, saws,
bee-uh - for - you, gee-oh-for-you

John: Why did the gee any say ay for you?

(They pick up two cartons, put them on their heads and march around)

Jim: Bum-tee-bum-ah-bum
Jim: Where is the waste basket?
John: There's the bag basket.
Jim: That's the bake basket
John: This is the real bake basket
Rake basket" (5)

The chants, nursery rhymes, songs of childhood, all serve to help the child explore and become familiar with sounds of words.

Expressive language experience also contributes to the success of early reading experiences. The speaking child profits from the constant use in speech of the words and phrases in his first reading book. As F. Schonell states in the Psychology and Teaching of Reading (6)

> "There is undeniable evidence to show that a strong use of saying and hearing words is of inestimable benefit to children in developing adequate powers of word recognition in the early stages of their instruction."

We recognize that there are conflicting opinions regarding the value of oral reading during early reading experiences; however, it is generally agreed that early reading material should be set against the child's own vocabulary and language patterns. Through constant use of words and phrases a child is better able to bring meaning to the words and thus to make full use of, as Frank Smith would phrase it, "syntactic and semantic redundancy of nonvisual sources of information." (7)

Recognizing that the children in our programme have not had the opportunity to "play with sound" or to use words and phrases, we felt that our "reading" programme must be extended to provide these language experiences through symbols. In reading the list of "reading activities into which symbols have been integrated", contained in the report, this frame of reference must be remembered.

(B) Symbol Use Related To The Reading Process

The manner in which symbol use was considered as directly related to the reading process can best be understood through focussing attention upon the activity of the reader rather than upon the material read. As Frank Smith states: "The brain - our prior knowledge of the world - contributes more information to reading than the visual symbols on the printed page." (8)

Further clarification of this view is given in the following definition of reading:

> "Reading involves the recognition of printed or written symbols which serve as stimuli for the recall of meanings built up through the reader's past experience. New meanings are derived through manipulation of concepts already in his possession. The organization of these meanings is governed by the clearly defined purposes of the reader. The reading process involves both the acquisition of the meanings intended by the writer and the reader's own contribution in the form of interpretation, evaluation, and reflection about these meanings." (9)

Any work involving the recording and the ensuing interpretation of Bliss Symbols becomes part of the "reading" programme. The process of deriving meaning from Bliss Symbols parallels the process of deriving meaning from words. The child also develops reading skills through practice in discovering the critical difference between visual stimuli, through establishing left - right progression, through opportunities for the development of perceptual and cognitive skills common to both symbols and words.

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## CONTRIBUTIONS OF THE PSYCHOLOGY DEPARTMENT TO THE BLISS PROJECT 1972-73

The developmental implications of acquiring Bliss Symbols as a means of communication, were considered to be an important area for investigation by the Bliss team member from the Psychology Department.

An adapted version of Mykelbust's Model of the Hierarchical Relationships of Man's Verbal Systems (Figure 1) illustrates how symbol use is related to the development of other skills and abilities. In this model, symbols are considered to be substitutes for expressive language. As such, it is hypothesized that Symbols contribute to the child's total development in much the same way as expressive language does. The model also illustrates the relationship between symbol usage and the acquisition of reading and writing skills. (See Appendix of educational report.)

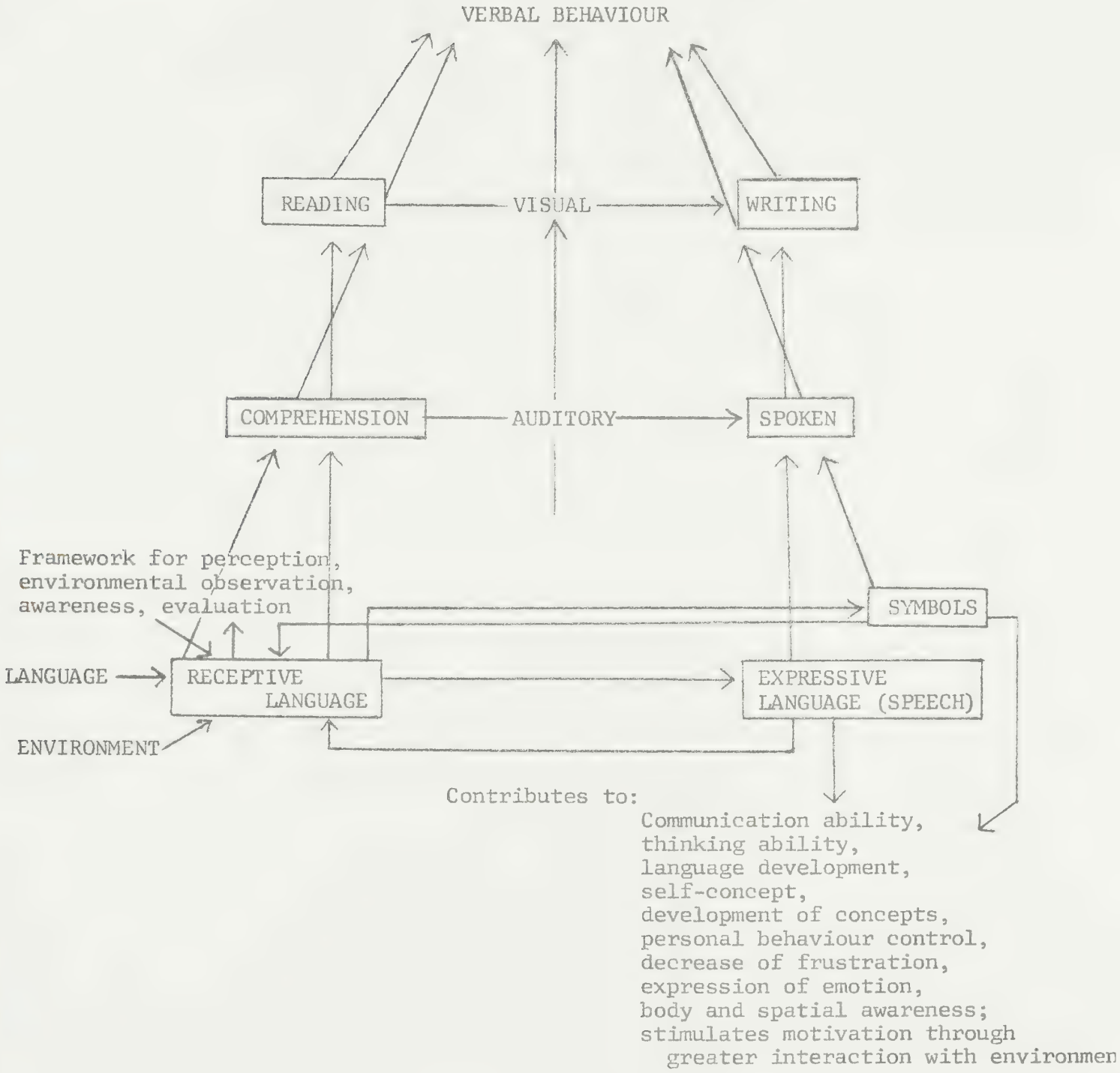
Within this framework, the objective of this team member was to assess such related areas of development as e.g.(intelligence, communicative output, image presented to others and social interaction).

The Columbia Test of Mental Maturities, the Peabody Picture Vocabulary Test and the French's Pictorial Test of Intelligence were administered to each child for the purpose of obtaining a baseline measure of the children's individual intellectual functioning. This pre-program assessment was carried out in September 1972. Post-test measures took place in May or June, 1973, and involved re-administration of the Columbia and Peabody Tests. All Children in the "340" class were given the verbal portion of the Weksler Intelligence Scale for Children (WISC) as well as the Picture Completion sub-test of the WISC Performance scale, in February, 1973. The children used their symbols in responding to the verbal items. In addition, in June 1973, the children in the "340" class were given Vernon's battery of tasks as adapted from Piaget.

Exploration of the test library of Ontario Insitute for Studies in Education revealed a paucity of materials suitable for children with no functional speech. Non-verbal and "culture free" tests generally required fine motor manipulation skills which

FIGURE 1

DEVELOPMENT OF LANGUAGE (Model adapted from Mykelbust)



these severely handicapped cerebral palsied children did not have (e.g. Hiskey-Nebraska Test for General Capacity.) The only tests suitable for all the children were those in which responses through gross pointing could be validly allowed (e.g. Columbia, Peabody and French's.) French's Pictorial test was later discontinued from this adapte test battery as the children's responses were often unclear and therefore unreliable.

It was recognized during the program that these tests yielded only rough measures of the child's cognitive ability. Therefore, in February 1973, the WISC was administered to those children who had acquired sufficient skill with symbols to be able to give full responses to the test items using symbols. These children con-constituted the "340" group.

It was felt that knowledge of the child's cognitive level within the Piagetian framework (See Appendix 1) would provide useful information for the teachers as a guide to programme planning. As these Piagetian tasks require a degree of motor skill, they could only administered to those children whose hand functioning was somewhat controlled (e.g. the 340 class).

All children, except one, showed gains (according to gross test measures) which were not significant beyond what could be normally expected in one year of development. The exception was a boy whose assessed general level of intelligence developed significantly during the academic year from the low average range of ability to a level well beyond his chronological age. In addition, general performance (as observed on a daily basis) suggested that this lad had intellectual potential.

The WISC results (February 1973) indicated common trends of strengths and weaknesses. In general, the children were within average limits in verbal reasoning ability, in learning the meanings of words and in the ability to attend to visual details. They were significantly below average in information picked up from the environment, arithmetic, social judgment, and ability to attend to auditory details. The skills required to learn symbols, plus the type of experience provided through symbol usage accounts, in part, for the strengths (i.e. visual and reasoning skills). The weaker areas (i.e. auditory attention, arithmetic and social skills) had been given less emphasis prior to February, 1973.

One boy's results did not indicate this pattern of strengths and weaknesses, but rather showed a consistent functioning level which was 3-4 years below his chronological level. He had been considered by his teachers to have more limited ability than the others.

Teachers generally felt that these assessment results accurately substantiated subjective feelings they had had about the children's abilities. These results therefore provided objective verification by means of valid standardized measurement techniques.

Piagetian task results indicated that none of the children understood the concept of conservation. Although some of them showed adequate verbal reasoning skills they lacked the experience necessary for understanding conservation. Most of the children's responses indicated that they were in the Intuitive stage of development. However, some were still predominantly in the Pre-Operational stage, even though their chronological age indicated that they should be performing within the stage of Concrete Operations. When these results were interpreted to the teachers they felt that there were great implications with regard to the type of learning these children have yet to experience.

In general, the assessment results revealed great gaps in the cognitive development of these children which could be remediated, at least in part, by providing experiences which would solidify the foundations on which more learning would take place.

The Communicative output of the children was recorded on a regular basis during the program. The form used (Form 1) was developed jointly with the Speech Pathologist. The time samples taken constituted individual recordings of each child's output during a thirty minute group discussion time, which was usually teacher-directed The recording was done primarily by four trained volunteers. A total of twenty recordings, collected for each child on a rotation basis were obtained. Approximately ten recordings were obtained prior to January 1973. The remaining ten were collected subsequent to this.

Form 1 was considered to be a gross instrument and the results obtained must

FORM 1 - CATEGORIES AND MODES OF COMMUNICATION

NAME:
DATE:

TIME:
RECORDER:

| CATEGORY | GESTURES | SYMBOLS | ALPHABET | SPELLING | SPEECH |
|---|---|---|---|---|---|
| | | | | | |
| (1) a) Vocalization<br>b) Purposeful Vocalization | | | | | |
| (2) 'Yes' and 'No' | | | | | |
| (3) Physical needs | | | | | |
| (4) Shadow-talking | | | | | |
| (5) Appropriate response | | | | | |
| (6) Irrelevant response | | | | | |
| (7) Perseveration of response | | | | | |
| (8) Spontaneous speech and gestures | | | | | |
| (9) Asking questions | | | | | |
| (10) Peer interchange | | | | | |
| (11) Expression of emotions | | | | | |
| (12) Expression of thoughts | | | | | |
| (13) Initiation of the topic | | | | | |

therefore be considered as indicating only gross trends. Although the volunteers provided an invaluable service, the need of a consistent recorder, responsible for the overall recording during the program, was felt necessary, with volunteers providing supplementary recordings under the direction of such a person. Time and lack of resources precluded this possibility. Volunteer services decreased after April 1973. A further difficulty was the lack of standardization of the recording situation, e.g. one child might be the primary speaker during one session but during the next session he might have only a few questions directed at him. With a larger amount of data these differences would become more statistically meaningful but with the data available only gross trends emerged. Another difficulty with these recordings stemmed from the "Unobtrusive observer." There were usually many adults in the classroom. The teacher, and often the children, were somewhat distressed at having another person, (i.e. the recorder) in the classroom of 5 children, particularly if more than one recorder was present at a time. This problem was legitimately understood, although never entirely resolved. Despite these difficulties and the grossness of the measures, certain trends in the development of communicative output did emerge in both classes.

These trends are presented in Table 1.

TABLE 1

CATEGORIES AND MODES OF COMMUNICATION

MOST FREQUENTLY USED. (FROM FORM 1)

| | XMAS | JUNE |
|---|---|---|
| 340 Class<br>Categories of Communication | "yes - no"<br>Appropriate Response<br>Followed by:<br>spontaneous communication<br>purposeful vocalization | "yes - no"<br>Appropriate response<br>Spontaneous communication<br>Followed by:<br>asking questions<br>peer interchange |
| Mode of Communication | Symbols<br>Followed by:<br>Speech<br>Gesture | Symbols<br>Followed by:<br>Speech<br>Alphabet<br>Spelling |
| 100 Class<br>Categories of Communication | "yes-no"<br>Appropriate response<br>Followed by:<br>spontaneous communication<br>purposeful vocalization | "yes - no"<br>Appropriate response<br>Spontaneous communication |
| Mode of Communication | Symbols<br>Speech<br>Gesture | Symbols<br>Followed by:<br>Speech |

The frequency with which categories were used varied according to the following progression:

yes - no
appropriate response
spontaneous communication
asking questions
peer interchange

While symbols was the mode of communication most frequently used, the frequency with which Speech (whether vocalizing or verbalizing) was used increased. Those children who have been introduced to the Alphabet and Spelling were increasing their use of these modes of communication by the end of the year to the extent that they were moving towards a total communication approach to expression (i.e. gestures, symbols, speech, alphabet and spelling).

It is of interest to note that during the 1971-72 school year it was observed that the children were often regarded as dull or retarded when without their symbol trays. However, when using their symbols these same children were sometimes considered "bright". In order to investigate changes in the impressions others have of the children, Form 2 was devised. Each child was rated by a number of people in September, 1972 and again in June 1973. The form was distributed initially to people who knew the children with three varying degrees of familiarity as follows: "well" constituted those staff working closely with the children, "moderately" included the regular volunteers and "not at all" referred to strangers. This form provided an approach to assessment whether or not different trends existed in others impressions of the children according to familiarity.

Unfortunately, although the form was initially distributed to people within all three groups, response was poor from those who knew the children "moderately" and "not at all". As a result, the ultimate results were compiled from a rather homogeneous group, (i.e. those who knew the children well). These respondents indicated changes in their impressions from September to June.

There was less variability of impressions in June, a greater consensus of rating, and more definite patterns of impressions.

In the initial(September) ratings of the "340" group, those children who were new to symbols had been underestimated in their functioning; those who had been

NAME: RATER:
AGE:

Put a line anywhere on the scale that best describes the child according to the following dimensions:

| | 0 Much Below Normal | 20 Below Normal | 40 Normal | 60 Above Normal | 80 Well Above Normal | 100 |
|---|---|---|---|---|---|---|
| Ability to pay attention | | | | | | |
| Ability to work independently of encouragement | | | | | | |
| Level of alertness | | | | | | |
| Frequency of responding to verbal stimuli | | | | | | |
| Appropriateness of responses to verbal stimuli | | | | | | |
| Frequency of initiating "conversation" | | | | | | |
| Type of educational placement | | | | | | |
| Highest future potential | | | | | | |

(1) Homebound (10)
(2) Sheltered workshop (30)
(3) Protected employment (50)
(4) Further academic work (70)
(5) Gainful employment (90)

# "BLISS PROJECT"
# SPEECH PATHOLOGY PROGRESS REPORT

The speech pathologist working with the physically handicapped child recognizes that there exists within this population a small number of children who are unable to develop functional speech due to the severe amount of motoric involvement of the articulatory, phonatory and/or respiratory systems. This inability to speak not only deprives these children of the most fundamental tool of communication but also retards their total language development. It creates within them severe feelings of frustration and affects their emotional, social and intellectual growth. Speech pathologists have for a long time recognized the need of these children for an alternate means of communication to substitute for oral speech. At centres throughout Canada and the United States speech pathologists have attempted to develop communication boards using pictures, the alphabet and/or words to provide a means of communication for the physically handicapped and several have recently printed descriptions of their programs (McDonald and Schultz, 1973; McDonald, Murphy and Huskey, 1972). However most clinicians working with these boards have recognized their limitations in terms of restriction of content if pictures or a small vocabulary are used, or delay in communicative ability until the child has learned to spell and read if alphabet or word boards are employed. Following a paper given on the Bliss symbol program by this writer at the 1972 Convention of the American Speech and Hearing Association over one hundred letters of inquiry were received, all of which stated the need for a more appropriate and extensive communication system for the physically handicapped than that which had been previously used. It was to meet the communication needs of those children at our Centre who despite numerous hours of speech therapy did not have the motoric ability to develop functional speech that the speech pathologist became involved in the development of the Bliss symbol program.

The role of the speech pathologist on the Bliss project over the past year has been a three-fold one: 1) serving as a resource person in the total development of the program, 2) obtaining speech and language assessments of the children both prior to and throughout the duration of the program and 3) offering speech remediation to the children in the program as the need for this is indicated.

involved in the symbol programme during 71-72 were overestimated (compared to the later June ratings). In the "100" group, those who had been involved during the 1971-72 programme were underestimated in the initial rating. No trend emerged for those children in the "100" group who were new to the programme.

One can conclude that although a person may have known enough to understand the reasons for their low level of performance, initial ratings were based on the child's actual performance. For example, in September one could not expect those children not exposed to symbols in the "340" class to be functioning as well as those who had become familiar with symbols the year before. At the same time these latter experienced children were seen as more capable as a result of their actual performance relative to the novices at that time.

It is possible that ratings changed as a result of increased exposure to the children, rather than as a result of actual change in the children's ability to use symbols. However, four of the children in this year's programme were known well to the staff at the time of the initial September rating due to the children's participation in the programme last year. Two of these children were overestimated and two were underestimated, relative to their June ratings. If change in rating had been a function of familiarity one would have expected more consistent ratings of these four children in September.

It was not possible to draw any firm conclusion due to the small sample size. However, this study indicates that, to a certain extent, the children's performance influences the impressions of others. This, in turn, effects how such persons will approach the child, what expectations they have of the child and how the child sees himself. Consequently the importance of giving the children a means of communication at an early age in order to help foster a positive self-image and establish more positive expections cannot be overemphasized.

It became apparent during the programme that knowledge of change in the children's social development was important. Several standardized tests of social development were considered (e.g. the Vineland Test of Social Maturity) and were found to have inappropriate norms for physically disabled children. After discussion with a researcher from the Metropolitan Toronto School Board, who was studying the social development of a group of retarded children, and seeing some of the scales

which she had developed, it seemed most appropriate to observe the children and make anecodotal recordings of their behaviour during free time sample periods.

Such time sampling was carried on regularly for approximately one month. However, other committments, lack of time and staff prevented further study of the children's social development throughout the remainder of the year.

Incidental behavioral observations throughout the year, on a casual unsystemmatic basis, revealed changes in the social interaction patterns of the children. In September all communication was directed through an adult - a pattern which the children had been involved in all their lives due to lack of speech. Direct conversation with peers had never been experienced. Situations were structured to encourage the children to interact with peers. The "340" group began to interact through the use of symbols. The "100" group relied on non-verbal interaction approaches such as touching, smiling, eye contact.

As observation of the children's behaviour and personality continued, the uniqueness of each child as an individual became increasingly more apparent. A reciprocal relationship emerged between symbol usage and personality, i.e. symbol learning was affected by personality, and personality in turn was also affected by the acquisition of symbols. Although all the children became more communicative, some children could be described as "quiet" and others as "talkative".

It became evident that symbol usage contributed to emotional development also. Symbol usage helped to alleviate the frustration of not being able to communicate beyond basic needs. Some of the children had reacted to this frustration by acting out, others by withdrawing. One of the boys who had presented difficulties in behavioral management was able to divert his disruptive acting-out tendencies in a more positive direction to reveal an inquisitive, curious, mischievious, talkative youngster. Another child, originally considered to be a placid, passive, co-operative child was able to demonstrate independent thinking, confidence and self-will. Although these aspects of her personality did not always involve co-operative behaviour, teachers and parents were able to appreciate these behaviours as part of the course of normal child development.

An anecodotal report of another youngster illustrates well the personality development observed in these children:

> "This particular lad, after being re-assessed with the Columbia Test of Mental Maturity enthusiastically said (with symbols) that he would like to create a test for the examiner. Several weeks later he asked for an appointment with the examiner. He arrived for the appointment with a large brown envelope containing a pencil, three cards similar to the Columbia cards and an answer form which had at the bottom IQ = _____. In devising his test he incorporated symbols with the principle underlying the Columbia Test and in presenting the cards, he asked
>
> ?÷ -! +
>
> which not belong?
>
> One of the cards presented the following symbols:
>
> car wheelchair bus taxi train
>
> After calculating the examiner's IQ by putting 3 over her chronological age, he said he would leave the test so that it could be administered to the other children. This was a poignant display of his intelligence, creativity, ingenuity and initiative."

As reported earlier, assessment of the intellectual functioning of these children involved surveying present instruments on the market and assessing the usefulness of the standardized tools presently available. This involved researching tests at the Ontario Institute for Studies in Education as well as discussions with visitors to the Centre who were trained in psychological assessment. It was a topic which arose during presentations given about the Bliss Project (e.g. at the University of Toronto, The Ontario Institute for Studies in Education, The Mental Retardation Centre, The International Conference of the Council for Exceptional Children.)

> "The most baffling problem in the testing of Cerebral Palsied Children is that of the child who has severe disability of the hands combined with little or no speech. Unfortunately there is at present no test which is really suitable for assessing the intelligence of these children and the most that the psychologist can do is to use his ingenuity to evolve special ways of helping the child to make known his response to test items. Many of these children convey most of their wishes and opinions in some kind of "eye language" which is understood by their parents and colleagues. Hence, perhaps the most effective results can be obtained from such children by encouraging this "eye language" for answering questions." (Eleanor Schonell, 1956)

From investigations carried out this year, it appears that very little progress has been made in developing suitable assessment techniques for this population of children. To date no tests, other than the few selected were considered

appropriate. With this in mind, it would seem that initially a crude, rather gross assessment must be done - with more refined verbal assessment following when the child has acquired symbols beyond the basic vocabulary.

The Bliss Project has involved intense participation from the team member from the Psychology Department in these research areas. In addition, it has been her role to initially screen youngsters from a psychological point of view for their suitability for admission to the programme.

Criteria for admission to this present programme were lack of functional speech; receptive language ability; visual perception skills - particularly form discrimination; and ability to derive meaning from symbols. As the need for working with the young, non-speaking children is seen to become increasingly more vital, the criteria for involving young children in a symbol programme will be revised to be less rigid. For such young children, lack of functional speech, good hearing and good vision are necessary. Other criteria are still being studied.

The representative from Psychology further acted as a consultant to teachers and other team members in the general area of child development. A knowledge of normal child development was a particular importance in vocabulary selection and in seeking appropriate expectations for symbol use. In this capacity she was requested to attend meetings and participate in decision-making.

For the most part, areas of further future development will include deeper and more refined investigation into many of the areas which have been explored to date in only a preliminary way. These include a careful review of the literature; further exploration of assessment tools with particular emphasis on the application of Piaget; refinement of means of assessing communicative output; study of social development and exploring the use of symbols by the 4-5 year old child.

To accomplish these objectives it will be necessary to have additional staff from the Psychology Department working on the project.

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# "BLISS PROJECT"
# SPEECH PATHOLOGY PROGRESS REPORT

In the capacity of a resource team member the involvement of the speech pathologist during the past year has encompassed a variety of activities. Of prime importance has been the participation in the decision making process through attendance at meetings concerned with the planning of the program. Areas of discussion in which the speech pathologist has actively participated include vocabulary development, the introduction of a syntax system, consideration of the present needs of each of the children and the on-going development and future goals of the program. The speech pathologist has also acted as a consultant to other Centres using the Bliss symbol system both by participating in the instruction of others during the two Workshops held at our Centre and through accepting an invitation to visit the program at the Sarnia Centre and address members of the Sarnia community on the Bliss program. In order to further contact with other professionals in the field of speech pathology and thus obtain relevant feedback, the speech pathologist presented a short 15 minute paper on the Bliss program at the 1972 convention of the American Speech and Hearing Association as well as several lengthier papers, two to members of the Ontario Speech and Hearing Association and another to a joint meeting of the Chicago Speech and Hearing Association and the Department of Communicative Disorders at Northwestern University. This latter session proved most stimulating as it generated much interest from faculty members at Northwestern who have recently developed tools for the assessment of children's syntax usage. It is hoped that in the future a study of the children's development and use of syntax through the symbol system of communication will be conducted at Northwestern University using their own population of cerebral-palsied children. In this regard the speech pathologist has been invited to present a graduate student seminar on the Bliss program at Northwestern University in August of this year. One additional presentation is to be given at the Conference of the Canadian Speech Association which is to be held in Toronto in August.

The speech pathologist has been involved in the assessment of children for admission into the Bliss program as well as in obtaining assessment measures of the receptive and expressive language abilities of those children in the program. For acceptance into the

program consideration was given to the extent of functional speech, hearing acuity, language comprehension, auditory and visual perceptual ability and general level of responsiveness. Many of these assessments have been conducted jointly with the psychologist or the occupational therapist on the Bliss team.

In order to adequately assess the language comprehension and syntax knowledge of the children in the program the speech pathologist had hoped to extensively explore the literature for assessment tools which are applicable and appropriate to the non-verbal physically handicapped child. Due to other committments and a consequent lack of time this goal was not attained and as yet totally adequate tools have not been obtained. There is some suspicion that the desired tools have in fact not yet been developed but considerable further investigation will have to be conducted before this conclusion can be drawn.

In September 1972, the Verbal Comprehension Scale "B" of the Reynell Developmental Language Scale was administered to all children in the Bliss program. In that this scale has been designed for use with physically handicapped, non-verbal children its administratio was appropriate; however, its norms have been developed for "normal" children and only extend to the age of six years thus imposing several limitations on its utility for the population of children in the Bliss program. Of interest were the results that only three of the nine children scored at over six years of age although all were chronologically older than this. These results thus substantiated the impression that many of the children, due to a lack of expressive language ability, had developed receptive language deficits as well. In June 1973, this test was re-administered to the six children who had scored at below six years with the results that all children showed development in their receptive language abilities ranging from a four month to a sixteen month growth over an eight month period. In addition, the Verbal Expression Scale of the Reynell was administered to the four children in the "340" symbol class using symbols as the means of response. Although the results were not scorable because of the inclusion of oral syntax features i.e. "-ing" endings on words, the responses of the children were of interest in that they indicated

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The speech pathologist working with the physically handicapped child recognizes that there exists within this population a small number of children who are unable to develop functional speech due to the severe amount of motoric involvement of the articulatory, phonatory and/or respiratory systems. This inability to speak not only deprives these children of the most fundamental tool of communication but also retards their total language development. It creates within them severe feelings of frustration and affects their emotional, social and intellectual growth. Speech pathologists have for a long time recognized the need of these children for an alternate means of communication to substitute for oral speech. At centres throughout Canada and the United States speech pathologists have attempted to develop communication boards using pictures, the alphabet and/or words to provide a means of communication for the physically handicapped and several have recently printed descriptions of their programs (McDonald and Schultz, 1973; McDonald, Murphy and Huskey, 1972). However most clinicians working with these boards have recognized their limitations in terms of restriction of content if pictures or a small vocabulary are used, or delay in communicative ability until the child has learned to spell and read if alphabet or word boards are employed. Following a paper given on the Bliss symbol program by this writer at the 1972 Convention of the American Speech and Hearing Association over one hundred letters of inquiry were received, all of which stated the need for a more appropriate and extensive communication system for the physically handicapped than that which had been previously used. It was to meet the communication needs of those children at our Centre who despite numerous hours of speech therapy did not have the motoric ability to develop functional speech that the speech pathologist became involved in the development of the Bliss symbol program.

The role of the speech pathologist on the Bliss project over the past year has been a three-fold one: 1) serving as a resource person in the total development of the program, 2) obtaining speech and language assessments of the children both prior to and throughout the duration of the program and 3) offering speech remediation to the children in the program as the need for this is indicated.

variability in the use of symbols for description purposes and gave clues as to the different ways in which the children perceive various situations.

During the past year the need to obtain accurate measures of the children's syntax knowledge, both receptive and expressive, has become increasingly evident. The assessment tools developed recently by speech pathologists at Northwestern University appeared to be relevant for these purposes and the available literature (Lee, 1966; Lee and Canter, 1971) on these techniques was studied by the speech pathologist and was made available to the linguist for his consideration. An attempt was made in June to elicit a spontaneous speech sample of fifty consecutive complete symbol utterances from the children in the "340" class so that the Developmental Sentence Scoring analysis (Lee and Canter, 1971) could be applied. However the children were not yet at the point of giving this structured an output and it is planned that in September a more basic form of analysis using Developmental Sentence Types (Lee, 1966) will be performed. In June, the Receptive Scale of the Northwestern Syntax Screening Test was administered to all nine children. As the norms only go up to the age of seven years it was not possible to obtain normative data for the children; however several trends were noted as to the type of receptive syntactic errors a majority of the children were making.

From this report of these initial assessments of the children in the Bliss program it is evident that considerably more work is required by the speech pathologist in the exploration for and development of relevant assessment materials. It is anticipated that this investigation will be on-going and that by the end of next year a more extensive and meaningful approach to assessment will be available.

The third function of the speech pathologist working on the Bliss program has been that of providing remediation services to the children. At the start of the 1972-73 academic year it was felt that only one of the children was verbalizing sufficiently in conjunction with symbols to warrant his being on an active speech therapy program and this child received speech therapy three times weekly throughout the year. However one of the results of the Bliss program which has been of particular interest to the speech pathologi: has been the finding that almost all of the children have begun to vocalize and/or

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verbalize extensively while using symbols. It would appear that as the need and pressure on the children for speech production is decreased, so also is the tension in the oral musculature decreased and thus they are able to verbalize more readily. While it should not be concluded that speech will develop sufficiently to be of functional use to these children, this behaviour is being encouraged and reinforced. In view of these developments, it was considered necessary to provide therapy for additional children so that by the end of the academic year five children were receiving speech therapy from one to three times weekly. Of interest was the fact that one of the children actively sought out the speech pathologist to ask if he too could receive speech therapy. Because of these findings careful consideration will have to be given in September to the therapy needs of each of the children for the forthcoming year.

In summary, the goals that were not achieved in the areas of the speech pathologist' involvement in the Bliss program during the year 1972-73 have been in researching the literature for available assessment tools in the development and application of these measures in terms of the needs of the population in the program and in providing sufficient therapy services to meet the developing needs of the children. In addition, it is felt that the speech pathologist should have had more time for actual classroom observation in order to remain sufficiently aware of the on-going development of the program. However it must be noted that participation in the Bliss program is at the present time only one of a variety of clinical duties of the speech pathologist. While an attempt will be made to pick up on these areas in the coming year, it is likely that these problems will not be overcome until a full-time speech pathologist is made available for participation in the program.

Judy Seligman, B.A., D.S.P.A.

July 9, 1973.

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# REHABILITATION ENGINEERING REPORT

# CONCERNING BLISS PROJECT FOR 72/73

## Original Proposals for 72/73

1. Completion of the electric motor driven pointer displays (total of five for the non-pointing children).

2. Development of functional interfaces for all non-pointing children.

3. Evaluation and possible modification of seating for all children.

4. Completion and introduction into the classroom of the "200" electronic pointer with functional interface by Feb. 16, 1973.

5. Development of a large scale group display and associated interfaces for pointers by May 1, 1973.

6. Development of a "144" electro-mechanical display for non-pointers for introduction into the classroom by Feb. 16, 1973.

7. Development of six "100+100" electronic displays for non-pointers by May 1, 1973.

8. Modification of "100+100" electronic display to a "200" display by May 14, 1973.

9. Supply of plastic covered symbol boards.

10. Development of teaching aids and other associated classroom equipment.

11. General maintenance of present equipment.

12. Technical support and advice for planning of future symbol communication devices.

13. Evaluation of interfaces and displays developed in this period.

Execution of Proposals

1. -five electric motor driven displays were provided by mid-November
   -two other pointers were provided, one in kit form, to interested outsiders
   -however, since this type of display is limited in its total number of symbols, and that it proved difficult for the child to operate, this approach was dropped in favour of an electronic pointer (see parts 7 & 8)

2. -functional interfaces were provided for all the non-pointing children except for possibly Darlene
   -Darlene is severely involved - this, coupled with the desirability of using only the hands to operate the interface, has led to a minimally workable interface for her. (In all fairness, it should be pointed out that functional use of the hands is very important. There is not sufficient time to teach the child both the use of his mind and the use of his hands separately. The incentive of communication can be used as a tool to both these ends. Ann has developed the ability to communicate slowly with her hands although she was originally in much the same condition as Darlene.)
   -for the above reasons, considerable effort was expended in attempting to achieve communication with Darlene through her hands. Apparent failure has forced us to consider other alternatives which will be explored this summer (see also section 3).
   -various other interfaces were devised, the most successful of which was a thin pressure sensitive pad that can be used outside the confines of the child's wheelchair (all other devices to date have had to be attached to the wheelchair's tray). Another interface in the form of a joystick was found suitable for Silvano, giving him control of four switches enabling him to scan in four directions (i.e., up/down and left/right). A reversing switch was also devised which scanned alternately in one direction and then the other each time it was used. This enables a child who can only operate two switches to scan the display in four directions.

3. -all the children's seats are assessed on a yearly basis because of their natural growth
   -several completely new seats have been found necessary during the 72/73 school year
   -special consideration is being given to Darlene's seating with the view of placing Darlene in her most

relaxed position in the hope that this will facilitate her ability to communicate (see section 2)

4. -the "200" symbol electronic display for non-pointing children was introduced to the classroom early in May, approximately two months late
   -introduction was late because this display had lost its priority position to the "100+100" display (see section 7)
   -in view of its immense cost in both parts and labour, its general non-portability and reliance on mains power this particular display was not considered practical
   -however, Silvano has used the machine very successfully over approximately two months, eventually utilizing all 200 symbols

5. -the concept of a large scale group display has been replaced by the idea of giving each of the pointing children their own display
   -this would more closely approximate the eye to eye contact established in normal communication
   -due to the difficulty in obtaining various parts and also unforeseen complications caused by the additional requirement that the elements of the keyboard be back-lit when activated, the completion date of May 1, 1973 has not been met and has been pushed back to Sept. 1, 1973
   -it is questionable whether or not this form of face to face communication could not be established by a "double upside-down" display board to be used with pairs of children facing each other, however one child would be forced to sequence backwards from right to left

6. -a "144" symbol display for non-pointers was delivered on approximately the proposed date
   -the symbols were arranged in a 12x12 matrix and could be sequenced by activating a pressure sensitive pad in two spots, one sequencing the lights down and the other sequencing the lights to the right
   -the device had the following advantages:
      a) in comparison with the "200" electronic display (section 4), it was relatively inexpensive
      b) it is simple in its construction. This makes maintenance and construction relatively easy for unskilled labour
   -the following disadvantages should also be noted:
      a) the lit element can only be moved in two directions (i.e., to the right and down)

b) because of its back lighting, the device draws considerable power making battery operation impractical and limiting its portability

-these disadvantages were overcome in the electronic "100+100" display (see section 7)

7. -only four of the "100+100" electronic displays had been delivered by June 22, 1973, about 1½ months late

-these were late for a number of reasons: difficulty in obtaining parts (L.E.D.s were approximately two months late in delivery), unforeseen technical problems in packaging, changes in basic design to allow operation by only two switches in a reversing role, insufficient personnel

-advantages of the device:

a) compact, light and portable

b) can be tailored to fit the particular child (i.e., can be operated with two or four switches; speed of scanning can be adjusted over a wide range)

c) symbols are displayed on two sides

d) is battery operated and hence much safer than a mains powered device

e) device can be converted from a "100+100" display to a "200" display in a make-shift fashion (section 8)

-disadvantages of the device:

a) L.E.D.s cannot be seen in direct bright sunlight and hence some form of shade is required for outside communication

b) the device, in its present form, costs about $500 ($200 parts plus $300 labour) which is comparable to the "144" electro-mechanical pointer and less expensive than the electronic "200" display (see section 4); however, it is hoped that this cost can be further reduced to approximately $300 per unit in small quantities

8. -two modified "100+100" displays have been made to indicate 200 distinct symbols (two more will be completed in July)

-this conversion is not satisfactory for the following reasons:

a) the person communicating with the child has to now stand or sit looking over the child's shoulder

b) the device is no longer able to stand by itself, but requires a table-top easel, making it less portable

c) two symbols are now indicated at any given time (one on each half of the display) making it confusing to a stranger, but nevertheless giving the child access to 200 symbols with approximately the same

facility that he had with the "100+100" display
-ideally, a double sided "200+200" display should be produced, however, in view of the fact that a "400" symbol display is envisaged (see 73/74 proposals - IPND "400") there is very little to be gained in building a "200+200" display system

9. -a number of plastic covered symbol boards have been produced for pointing children
-the best material for this appears to be polycarbonate rather than plexiglass, which fractures easily
-the chief drawback of polycarbonate is that it is almost twice as expensive as plexiglass. However, because of its virtual indestructability, this initial extra cost is justified.

10. -there has been little time available for the development and production of teaching aids, however a Bell & Howell Fische Reader has been extensively modified so that it can be operated by the children's interfaces. This device will be ready for the classroom by the beginning of the 73/74 school year.

11. -considerable support has been provided for the general maintenance of displays and interfaces
-none of the displays have required an inordinate amount of upkeep, however, the interfaces take a severe beating. This necessitates considerable maintenance and redesign.

12. -technical support and advice has been provided (see attached list)
-two proposals for the development and production of new displays, interfaces, etc, have been provided for the 73/74 school year (see attached proposals). The first proposal represents support for all aspects of the Bliss Project for the 73/74 school year, while the second proposal is severely limited to the development and producti of an electronic display (IPND "400") for the non-pointir children.

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Rehab. Engineering

GHI/gr
16/07/73

# INTERFACES

## PLANNED and DEVELOPED in 1972 and 1973

### Introduction to Interfaces:

During the first year, 1971 - 1972, working at the Bliss project, it became evident that the more severely handicapped child not able to point with one finger would need a more complicated display unit for symbol usage.

This unit should fulfill a highly complex (almost sophisticated) task:

1) to accommodate symbols
2) having a pointing system (either by an electric motor driven pointer; lighting of the indicated symbol; electronically driven indicator, etc.)
3) interface being easily operated by the child to indicate the correct symbol
4) mechanism allowing faster reach of each symbol
5) non-interference with other activities (play, eating, shopping)
6) light, easily transportable, easily attached to the child's wheel-chair
7) appearance, aesthetically pleasing, should not cut off child's vision, socially acceptable
8) the design of the unit should be such that the child has constant access to it in his every day activities

During the reporting year, 1972 - 1973, we were working toward such a display unit. However due to the complexity of cerebral palsy, a long period of observation, trial, re-designing and further researching of ideas was necessary. Therefore we were not able to find a satisfactory answer to all aspects.

Some of the contributing factors were:

1) lack of time available to staff working on the technical angle
2) lack of training time with the child on a new interface
3) lack of financial assistance to develop and carry through ideas
4) the child's programme and learning of symbols moved faster than equipment could be developed

The role of the Occupational Therapist working in the Bliss project was to develop, in co-operation with the Rehabilitation Engineer, a suitable interface to operate the display unit. This year we have been concentrating our efforts toward hand controls only, for several reasons:

1) The reflex activity in a C.P. involves the whole body, even when one part appears to be more controlled.
2) The startle reaction will always cause a delay in responses.
3) Through proper seating, with additional adaptations, one can achieve facilitation to bring arms to the mid-line. As soon as arms are brought to the mid-line, the child has better control.
4) By making use of the hands to operate the switch (interface) rather than other parts of the body, one achieves more function, i.e. playing, feeding, etc.
5) The traditional head sticks have proved to increase tension in the muscles in lips, tongue and throat; the tools used to vocalise and form words. Considering the social aspects, a child or adult looks more handicapped and deformed with a head stick, and many teenagers are starting to reject it for this reason.
6) A switch attached to any part of the body will, in operation, have a delay in response due to the nature of the brain damage in C.P.'s.

There are cases where deformities are too established but a long trial period is worthwhile when we consider the years of adulthood ahead of these youngsters.

For those familiar with the problems of the severely handicapped C.P. it appears sometimes impossible to make any functional use of their hands.Often the tendency is to utilize a head or foot movement to activate the interface. A well organized training programme, using proper seating and therapy, has a much better chance of supplying the child with interface control using the hands or fist.

INTERFACES

1) Three Mode Touch Switch:

This unit consisted of an I.C. comparitor chip plus switching transistors for motor drive, operated from four 1-1/2 vold 'D' cells; Copper plates used as electrodes, one for left, one for right and the other electrodes connected to the body.

The principal of the operation is as follows:

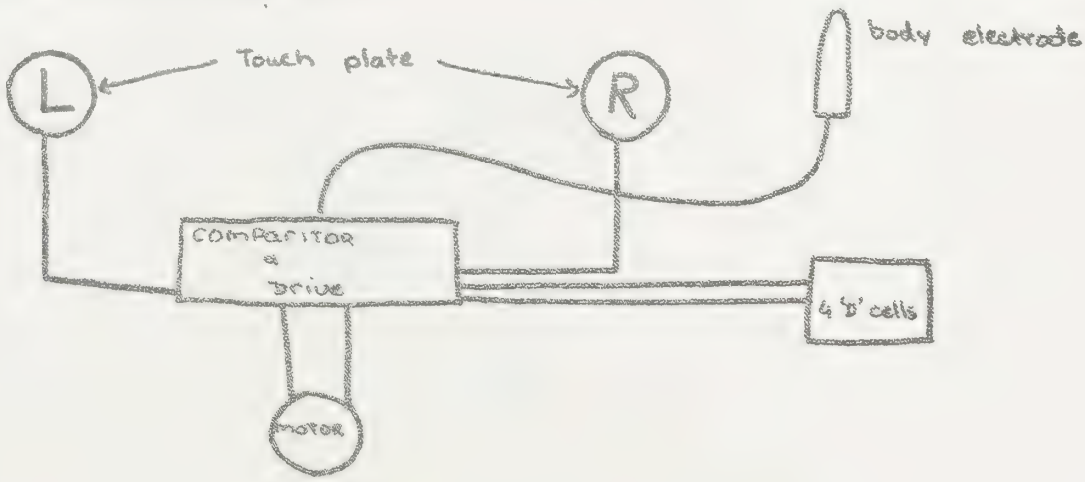
With the body electrodes attached to the patient, when the patient touched either (L) or (R) electrode, the skin resistance caused an imbalance in the circuit which when detected by the comparitor and the associated circuitry, caused the motor to be driven in the appropriate direction, i.e. left or right.

Advantages:

a) no force needed to operate switch, touch only required; this is an advantage with hypotonic children
b) touch plates easily moveable to suit child
c) touch plates being approximately 1/16" or less do not interfere with other activities on a flat surface

Disadvantages:

a) due to inconsistent skin resistance, variable results were achieved; sweating and drooling also caused leakage resulting in unreliable performance
b) inertia of motor and difficulty of providing dynamic breaking without further elaboration of circuitry
c) cost
d) some difficulty in attaching electrode to patient (this particular patient disliked body attachments)



2) Body Switch - Hand Held:

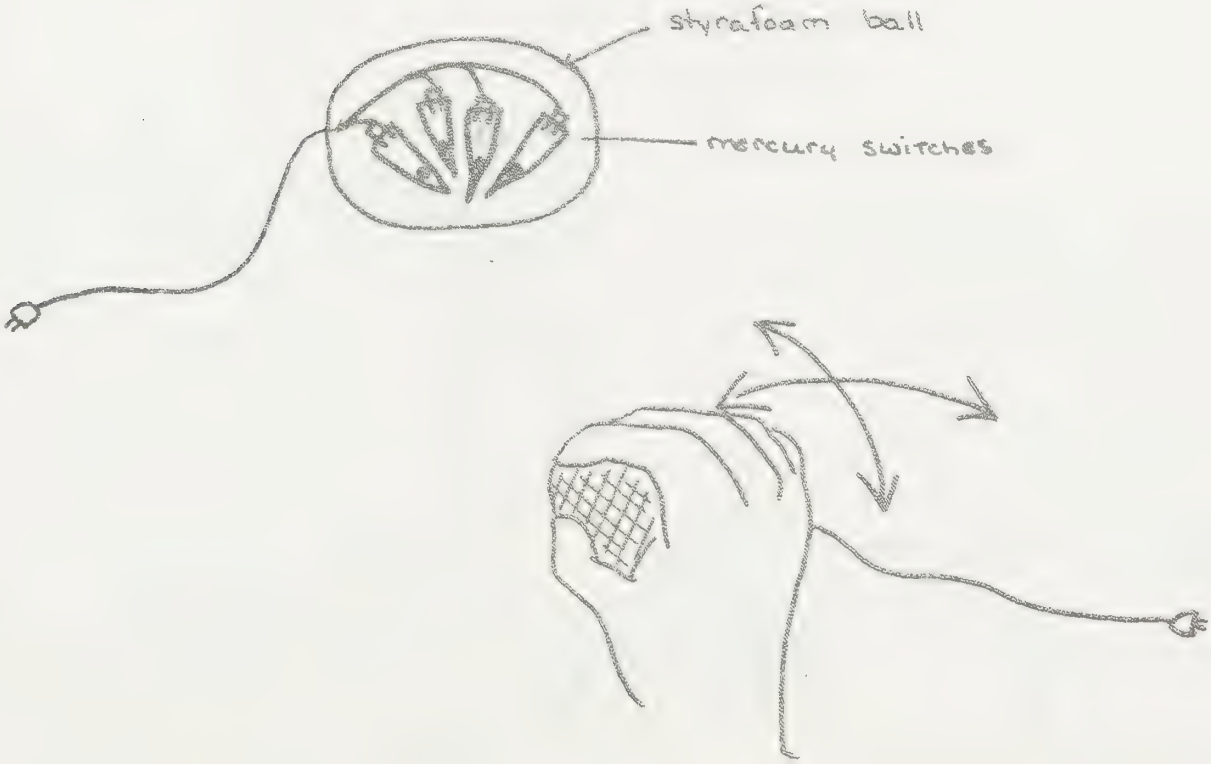
This unit consists of mercury switches mounted such that gross movements only are detected. These movements are made adjustable to approximately a range of 100 - 150 deg. in two planes at right angles and are tailored to individual patients. Other untried principals could be a bi-axial clinometer or magnetic pendulum with adjustable arc and damping. The mercury switch type was tried with little success due to complex reasons given below.

Advantages:

a) portable
b) can be used in any position
c) it would be most applicable to patients such as those with muscular dystrophy, spinal muscular atrophy, arthrogryposis, quads and polio as a control interface (such as for electric wheelchairs, typewriters, etc.)

Disadvantages:

1) requires a high level of co-ordination and spacial perception generally lacking in C.P.'s.



3) Magnetically Operated Reed Switches:

This unit consists of magnetic reed switches (mercury wetted contacts) beneath thin plastic cover. It is operated by a magnet attached to wrist or hand sliding over the surface of the tray in close proximity to the switch. The proximity area within which the magnet will operate the switch must be indicated by a target area on the surface of the tray.

Advantages:

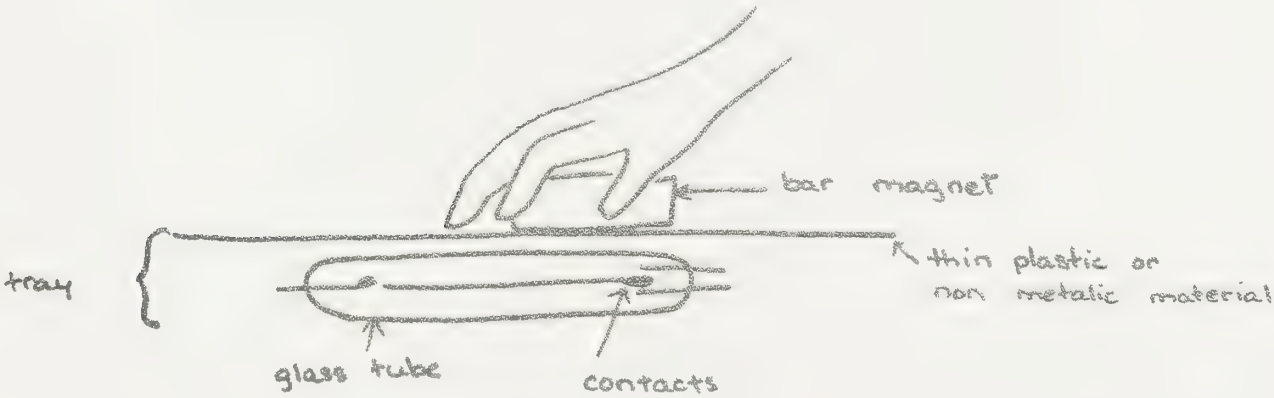
a) positive contact within target area, thus the position not unduly critical
b) flat surface does not intrude into other activities on tray surface

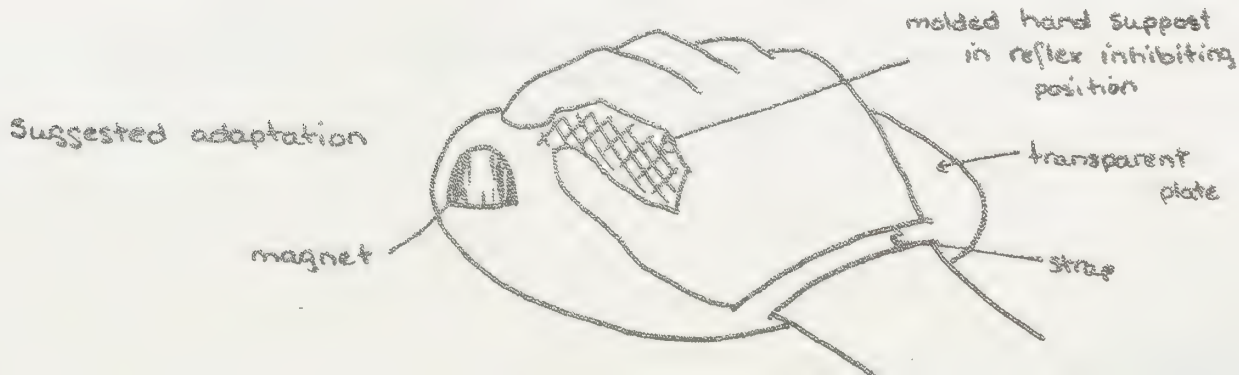
Disadvantages:

a) magnet must be detached when not in use as it interferes with other activities on the tray
b) subject disliked any bodily attachments

Suggestions:

Need to develop custom fitted, stable base for such attachments for future trials due to instability encountered.



4) Horizontal Push Button:

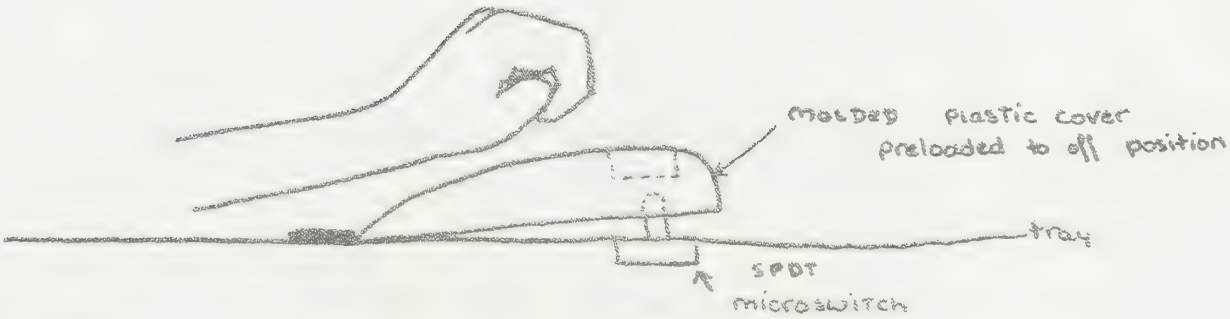
This unit is best described in diagram form.

Advantages:

a) reliable
b) works well with certain children who have gross motor pointing, and ability to press and release
c) simple and cheap device
d) force required can be varied by choice of switch and position of level action of switch cover

Disadvantages:

a) fixed location of switches on the tray interferes with other activities
b) not suited to children who cannot co-ordinate pressure over a restricted area
c) the size of the switches were required to be fairly small because of the display unit being used at the time
d) in some cases the texture of the switch surface over-stimulated the grasp reflex which resulted in switch damage (cover in different materials)



5) Vertical Toggle Switch:

As it's name implies, this is a common electric toggle operated switch, mounted through a flat surface with a flat, broad paddle attached to the toggle or handle of the switch. This increases the size and leverage of the switch handle, reducing the force required and increasing the target area. Two basic types were used:

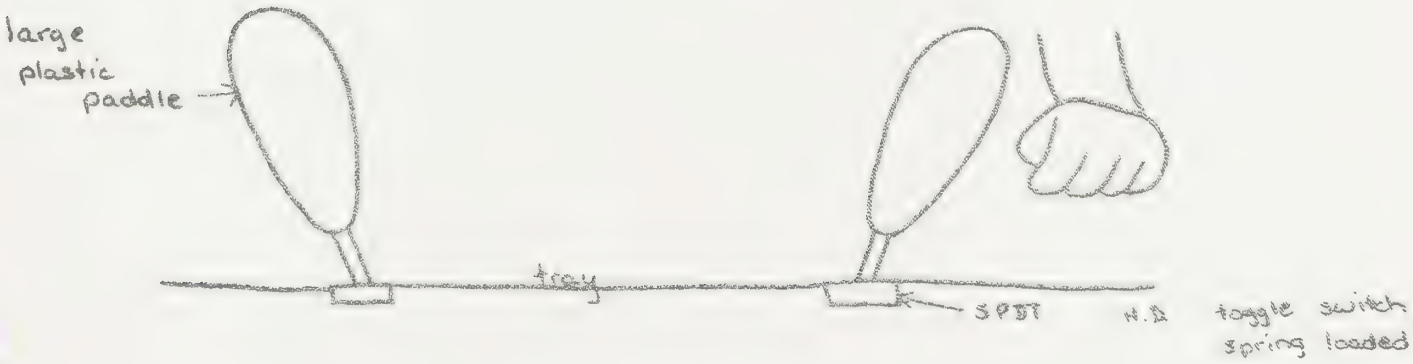
1) Spring loaded off position, single throw
2) Spring loaded off position, double throw

Advantages:

a) children with less co-ordination than required for unit 4 are able to operate this with fist or full arm movement

Disadvantages:

a) switches protrude 4 - 5" above the surface of the tray, intruding into all other activities
b) switches are in fixed locations
c) because of excessive force of operation the switch was frequently damaged, therefore needs a strong mechanical stop other than within the switch




use 2 SPDT for L and R
or use one with centre off position
DPDT spring loaded

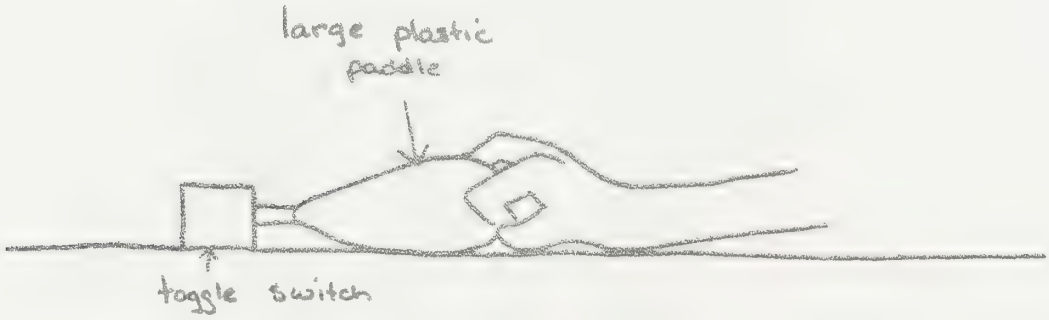
6) Horizontal Adaptation of Unit 5:

Advantages:

a) force required can be varied by choice of switch mechanism
b) worked well for severely involved children because hand can be stabilized by the surface
c) switch protrudes approximately 2" above surface and is farther away
d) can be operated by the fist or the toggle can be grasped between the knuckles
e) switch position can be adjustable
f) switch can be removed

Disadvantages:

- similar to those of Unit 5



7) Adaptation of Unit 4 (horizontal push button):

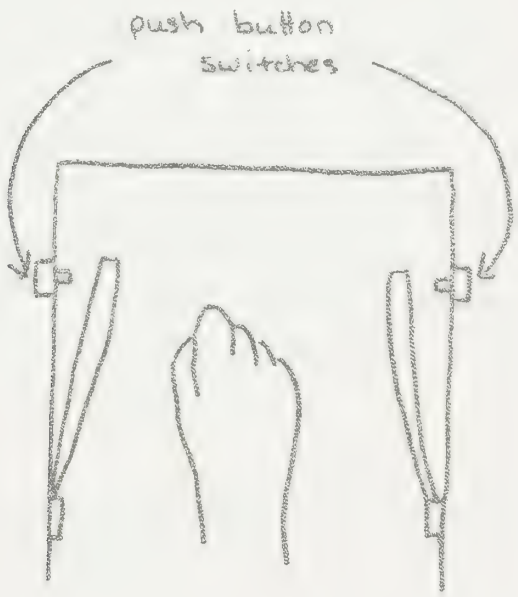
This unit contains two of the horizontal push button switches in a vertical enclosure.

Advantages:

a) the hand or fist can be restricted to the most appropriate area

Disadvantages:

a) this required lateral arm movements, which are weak and inco-ordinated in most C.P.'s
b) child had difficulties confining hand in restricted area
c) required fixed location and occupied too much space




viewed from above

8) Pressure Sensitive pad:

The pressure sensitive pad is basically one or more simple switches (single pole, single throw) incorporated in a thin cushion which is usually rectangular in shape.

For a single switch the pad consists of two pieces of copper screening separated by a sheet of 1/2" urethane foam rubber which has a hole of 2 - 4" diameter in it's centre. This permits the two copper screens to make electrical contact when the sandwich is depressed in the region of the hole.

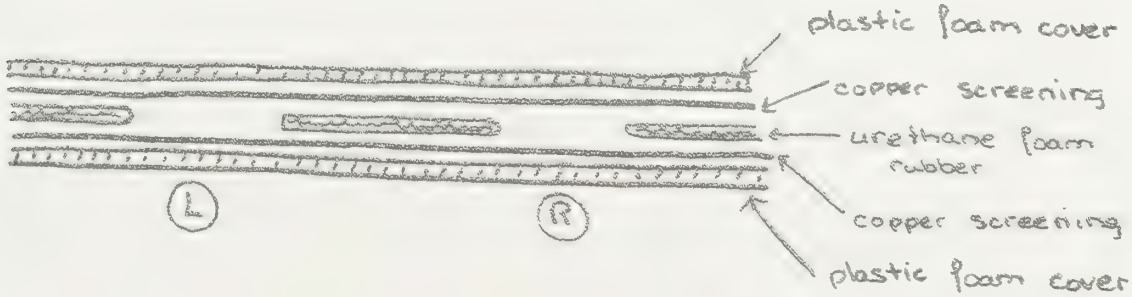
Multi-strand wires soldered to each copper screen were found most reliable for connecting the switch to the Bliss display. The sandwich of copper screening and foam rubber (stuck together with Barge All-Purpose Cement) is then covered with a synthetic vinyl leather (Uniroyal Naughahide) utilizing different colours if the pad contains more than one switch.

Advantages:

a) switches can be easily moved to suit child
b) because of the texture and resilience of the switch surface, the child receives tactile feedback
c) does not require a lot of pressure but more than touch switch
d) does not interfere with other activities
e) easy to add switches as required

Disadvantages:

a) not applicable to every child, especially for those with a fair amount of reflex activity
b) question long term durability



9) Joy Stick #1:

This joy stick is a cylindrical array of eight switches with a two way, four position gate so that only four positions are available at any time. It also consists of a vertical switch operated by downward pressure.

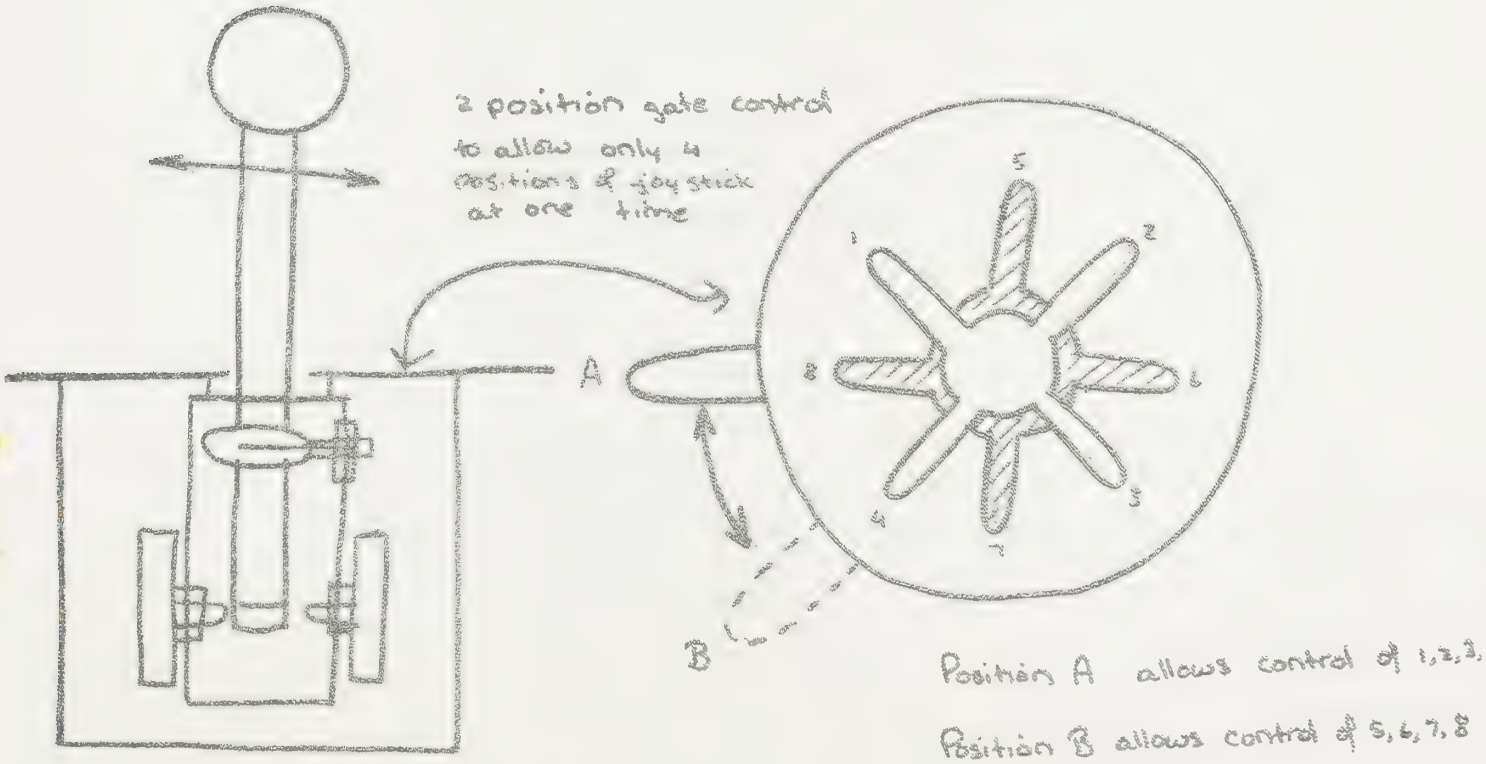
This unit also has built-in mechanical stops to prevent damage to the switch mechanisms. The mechanical gating system reduces targeting problems to a minimum, while still retaining eight positions. The operating lever also has a built-in resilience factor produced by internal spring loading.

Advantages:

a) targeting is not critical
b) the ability to shut out four gates makes targeting easier with the advantage of having eight gates

Disadvantages:

a) there is an extra operation required to get access to all eight gates
b) for further development a smaller switch box should be made



10) Joy Stick #2:

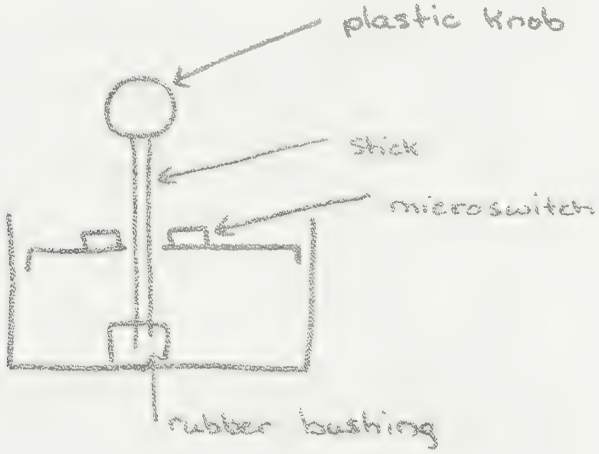
This joy stick is mounted in rubber bushing in the base of a metal container. Around the joy stick and at a pre-determined distance from the base, a mounting chassis for four micro-switches is attached to the walls of the container. The position from the base to the chassis determines the movement necessary to operate the switches.

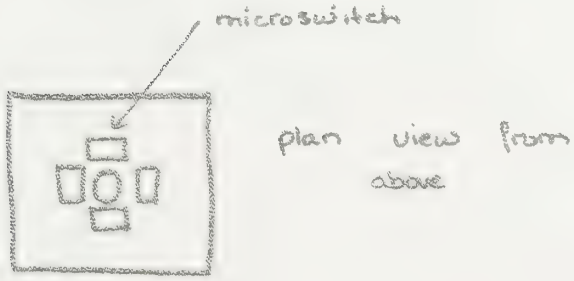
Advantages:

a) very little movement required

Disadvantages:

a) does not give any sense of direction; this is difficult for C.P.'s
b) more advantageously used for other handicaps, perhaps to run an electric wheelchair where you get a positive feedback of direction



11) Joy Stick #3:

This is an adaptation of joy stick #2, with a coil spring replacing the rubber and external mechanical positive gating system added.

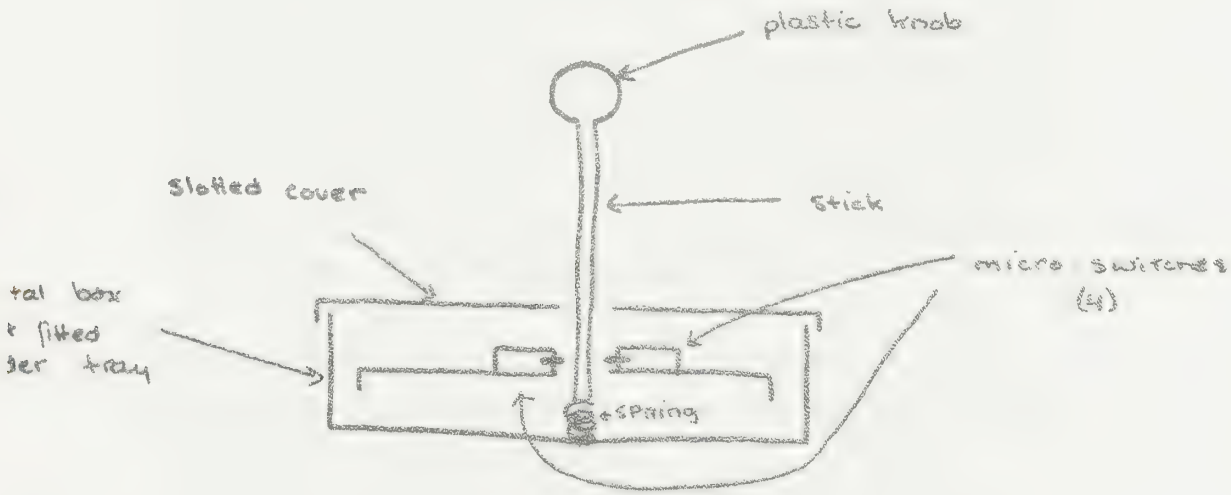
Advantages:

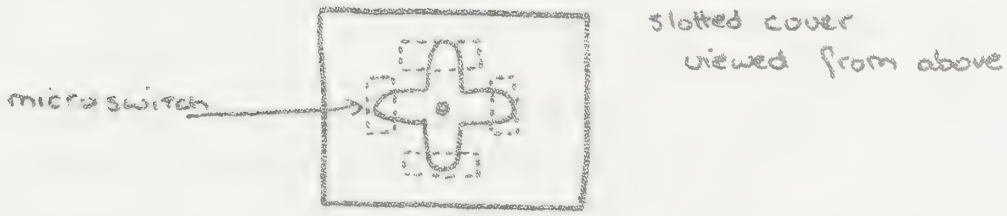
a) gives a better feeling of direction

Disadvantages:

a) child had problems with lateral mode of operation

b) again a smaller switch box should be made in future



12) Overhead Joy Stick:

Consists of a cantilever arm and switch unit above and anterior to a child's normal head position. From this is suspended a long rod or joy stick down to a working surface within the child's reach. The rod contains a telescopic descending section which enables the end point to remain in close contact with the working surface as the rod is moved through a circular path. This means that the rod can be moved anywhere within the child's reach and grasp. The movements of the rod can be restricted to left, right, fore and aft by the mechanism of the upper end of the rod or end of cantilever. You can adjust the range and direction of movements at this point. This pre-set restriction of movements can be de-activated and in this mode, with a crayon or marking device at the lower end of telescoping section can be used as a stable base for drawing activities, it could be used as an aid for moving objects . With a spring loaded action in the lower telescopic section this device could be used with a paint brush.

The activity can be restricted by a secondary restraining mechanism also attached to the upper mechanism. Viscous damping could be incorporated in the above section.

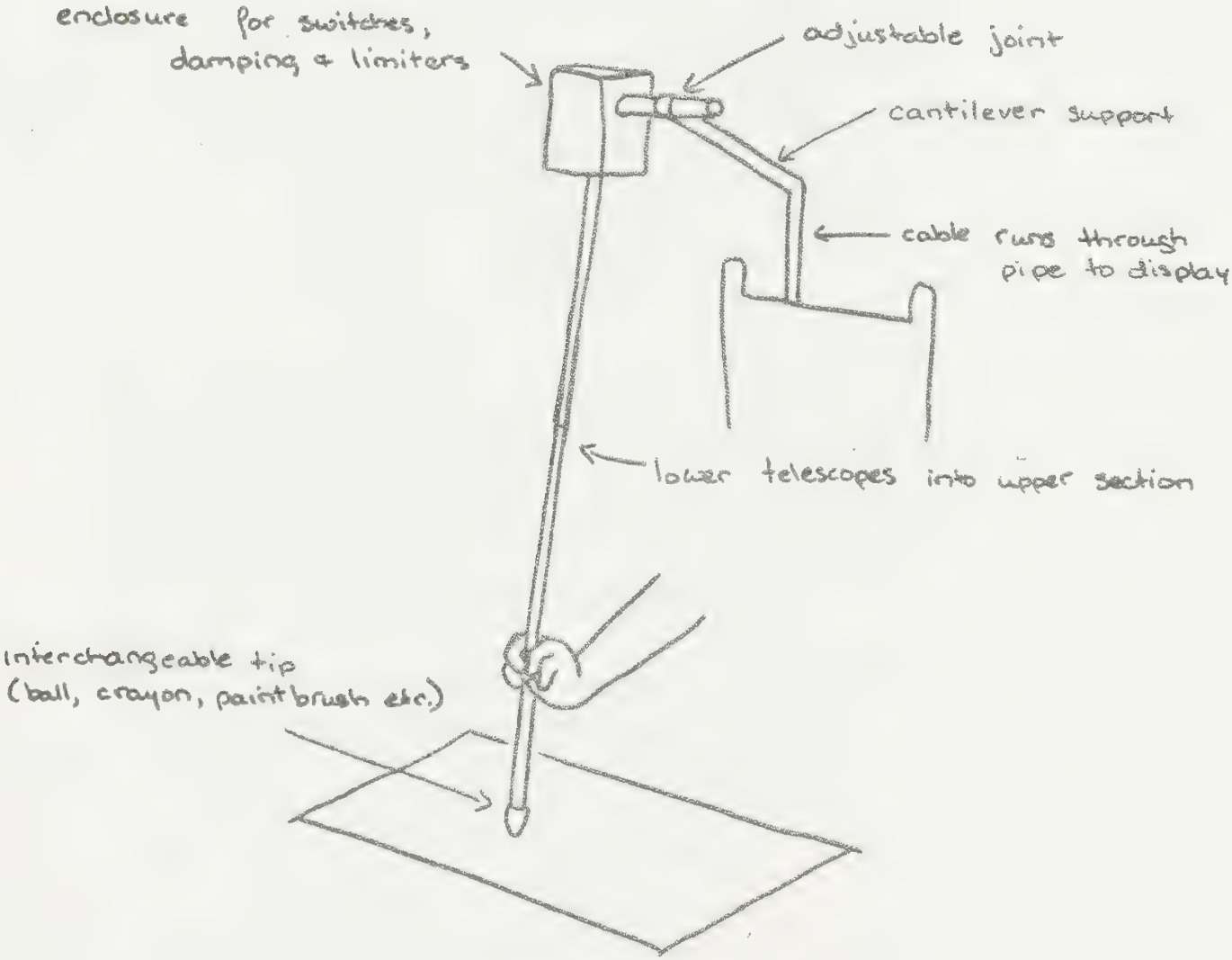
This device was tried in a crude prototype form, and even at this stage it's greater potential was evident.

Advantages:

a) this is the only device with potential for numerous activities other than switch control
b) the point of grasp can be anywhere along the rod, so the child's accuracy in grabbing is not so important
c) the rod does not interfere with other activities
d) compared to a head stick it can do many of the same activities but it is much more acceptable in appearance and to the child

Disadvantages:

a) must be attached to a stationary object, i.e. wheelchair
b) limited portability


enclosure for switches,
damping & limiters
adjustable joint
cantilever support
cable runs through
pipe to display
lower telescopes into upper section
interchangeable tip
(ball, crayon, paintbrush etc.)

Adaptations to be used with Interfaces

1) Restraining Loops:

These loops are made of a rigid plastic tube and attached to the tray. They help to keep arms at the mid-line and at rest on the tray. When extension pattern occurs the arms are restricted by the loop, thus making it easier to gain control of the interface. The loops should be made large enough for free movement of the hands.

Suggestion:

Loops could be made removable so they are used only for training purposes (interfaces, typing for athetoids).

2) Restraining Cushion:

This cushion was made from styrofoam and covered with vinyl. The cushion encircles the child's chest at a height where adduction of elbows to the body is impossible. The cushion should slant outward to a point where the child can easily rest his arms and move his hand from switch to switch on the interface. This adaptation can, in some cases, prevent the startle reaction pattern and A.T.N.R. reflex. This cushion was used as a training aid and was removable.

3) Wings:

We called this adaptation "wings" because of the resemblance. They are made of unbreakable plastic and are attached to the molded insert, along the trunk, on either side of the body. The height reaches from tray surface to shoulder level. In width they are sloped out to the end of the tray. The edge of the curve is rounded to allow the arms a smooth flow up and down.

This adaptation can be effective in bringing the arms to the mid-line. A total extension pattern is impossible with the addition of a chest strap.

In using transparent plastic these "wings" will not detract from the child's appearance and therefore could be left on at all times.

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please
I'm sorry
thanks
question
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who
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or
more
most
I, me
you
he, him
she, her
they, them
to like
to laugh
to tease
to cry
to love
when
where
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which
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and
opposite
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it
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part
similar to
man
father
brother
family
teacher
therapist
doctor
nurse
dentist
to want
to learn
to think
to wish
to understand
lady
mother
sister
child
friend
policeman
visitor
stranger
workman
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to kneel
to catch
to make
to forgive
to guess
to save
to give
to receive
to read
to have
to work
to play
to help
to feel
food
drink
sleep
change
happy
sad
angry
afraid
to grow
young man
quick
left
right
to see
to speak
to hear
to eat
to touch
to wash
toilet
medicine
to dress
help
excited
lonely
proud
upset
surprise
mean
sick
pain
loud
expensive
good
difficult
interesting
funny
special
big
long
heavy
thick
full
before
after
over
under
between
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there
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around
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correct
safe
pretty
little
hot
wet
dirty
safe
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out
to
from
on
for
forward
open
broken
dead
number
purpose
idea
to measure
to count
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2
3
4
equal
square
circle
rectangle
triangle
nose
mouth
eye
ear
nose
colour
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to multiply
to divide
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(100)
(10)
(1)
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hand
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legs
body
clothing
dress
blouse/shirt
school
store
park
plaza
church
home
street
backyard
door
room
car
bus
train
pants
shoes
accessories
pocket
hospital
show
country
lake
restaurant
stairs
floor
window
cupboard
wall
airplane
bicycle
boat
garage
elevator
book
workbook
scissors
tool
story
word
desk
blackboard
news
symbol
sport
to fight
to swim
outing
soup
meat
bread
cheese
milk
typewriter
money
parcel
letter
gym
art
music
television
record
game/toy
doll
cards
puppet
hobby
vegetable
potato
fruit
dessert
treat
furniture
chair
table
bed
telephone
electricity
light
water
fire
mountain
seed
flower
grass
tree
earth
weather
sun
rain
snow
wind
protection
cutlery
container
comb
towel
air
sky
moon
star
rocket
animal
pet
insect
bird
fish
cloud
ice
thunder
pollution
fog
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yesterday
to-morrow
morning
year
month
week
week-end
past
afternoon
night
time
hour
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birthday
holiday
early
late
future

# Appendix B

S.D. WALDER REHAB. ENG.

CR 38

Experiences with developed interfaces: (only interfaces used in the classroom will be described)

ANN:

Ann is a very involved hypotonic C.P. with athetoid movements, poor head and trunk control, A.T.N.R. reflex activity,hands generally fisted and a moderate startle reaction. She is seated in a custom made molded insert with head rest, mounted on a Mooney base.

With Ann we tried a wide range of interfaces with additional facilitating adaptations.

First Ann was tried on the "Three Mode Touch Switch" (1), operating the electric motor driven pointer tray. Restraining loops were attached to the tray. In the beginning this interface looked quite promising. The restraining loops inhibited the startle reaction and A.T.N.R. reflex activities. Ann was able to open up her right hand, palm down, with the thumb and little finger fully extended. By touching her thumb to the left plate she could activate the pointer motion to the left and by raising her thumb and touching with her little finger could activate the pointer to the right.

For this patient there were many reasons for not continueing this interface (see disadvantages on page 65). As the size of the symbols was reduced, it required greater control to stop the pointer. At this time the motor in use did not immediately react to the stop action and the pointer would overshoot the desired symbol.

During this summer Ann's seat was re-adjusted.At this time we were developing the "Overhead Joy Stick" (12), which we tried with Ann. This was a big breakthrough for her output as she was able to operate it with a fair amount of accuracy. The biggest joy for Ann was being able to draw a circle with the joy stick, instead of her usual lateral strokes using her fists to hold a crayon. It was most unfortunate that due to lack of engineering time this interface could not be further developed. This interface was tried in the classroom too early and in too crude a format for it's success to be obvious and it was not used again.

In co-operation with the "Overhead Joy Stick" we made the previously described "wings". The "wings" worked well for Ann and helped her in bringing her hands to the mid-line without interfering with her vision.

We then introduced Ann to the "Horizontal Toggle Switch" (6), A cushion

padding was placed across her chest and under her armpits which made it impossible to adduct her arms or elbows. By the time the padding was removed Ann had learned to maintain her arms in the proper position.
Ann's hand function has improved in operating the "Horizontal Toggle Switch" so that when relaxed, she has fairly good control.
During the summer a simple 200 symbol board, without a motor, was sent home for trial, which Ann could take with her on outings. Astonishingly she is able to point with her fist with reasonable accuracy on this board. Ann's desperate need to communicate is starting to overcome her tremendous physical limitations. Also the constant use of her hands to operate the display unit has given her good training.

DARLENE:

Darlene is a very involved child with little useful function. Muscle tone fluctuates from very low in moments of rest or observation, to extremely high when trying to do an activity. Her A.T.N.R. reflex has some influence but it is not significant. Her main problem is a strong startle reaction which interferes with all activities. Darlene has some speech but it is not functional, especially in stress situations or with strangers.
Darlene is seated in a tiny tot wheelchair with a custom made reclined insert with a head rest.
Darlene was fitted first with a motor driven pointer tray and a "Push Button Horizontal " (4) interface. In order to make the operation of this interface easier different adaptations were tried. The "wings" were not successful because there was not enough restraint. She could still get her arms in adduction and therefore into a pattern of startle reaction. The same cushion padding as used for Ann was also tried without much success. The only way we could break her pattern a little was with a harness around her shoulders and attached to the wheelchair. In this way she was unable to get into a total flexion pattern. Still, in any stress situation, e.g. to give an immediate response, she would get "locked" in her startle reaction, unable to get her arms down and onto her controls.
Darlene is very eager and often tries too hard, which conflicts with her ability to function. On a one-to-one basis in a quiet environment she is able to function much better.

The "Horizontal Toggle Switch" was tried next. This worked better, but the basic problems remained the same.

DAVID:

David is basically a hypotonoc C.P., often described as "floppy" (flaccid) and a lot of stimulus is needed to upgrade his tone. He has to over-extend his elbows in order to stabilize his arm movements, and only gross motor pointing with a fist is possible for him. Head control is good, trunk control fair.

David is seated in a junior wheelchair with a molded insert which is also used as a car seat.

David was first fitted with an electric motor driven pointer tray with a "Vertical Toggle Switch" (5) interface. We placed the switches in such a way that they were within easy reach of either hand to encourage bilateral movements. He soon found it easier to stabilize his left arm (sitting on his hand) and using only the right to operate switches. We did not discourage this as David does not have any A.T.N.R. reflex. He was able to operate his pointer with good accuracy.

As we changed to the electronic display unit we introduced David to the newly developed "Pressure Sensitive Pad" (8). He enjoyed this new interface as he could also operate it while playing on the floor.

The significant change in David is difficult to measure by testing. David was a flaccid, sleepy child who did not pay much attention to his surroundings. It took him longer than his classmates to learn the symbols, but once they were introduced at home and being used he made good progress. He began to be more alert and showed a good sense of humour. As David became more alert his muscle tone began to increase and is therefore getting better control over his movements.

During the school holidays David was given a simple pointer board, with 200 symbols, for home use as a change. On his own he now developed the skill to point with one finger to the symbols.

SILVANO:

Silvano presents a picture of a moderately involved athetoid. He has the typical intermittent spasms which allow him only gross motor co-ordination. He does have a startle reaction (to noise, excitement) but it does not interfere with all activities.

Silvano is seated in a junior wheelchair with a simple insert. He also has a "spider walker" which he can operate very well.
Silvano was first fitted with an electric motor driven pointer tray and "Push Button Horizontal" (4) interface. He had some problem releasing the pointer at the right time and as a result would often overshoot the target.
For his new display unit we made the "Joy Stick #3" (11). This interface worked better but Silvano had difficulty with lateral movement to the right. We will try to correct this by making the switch more sensitive. A four control "Pressure Sensitive Pad" (8) is being prepared and will be tested during the new school year.

Scott, John, Joey, Greg and Kerri were able to point with one finger to symbols, and therefore needed no special devices or interfaces. They were supervised in seating and typing on an electric typewriter.

All these children had a custom made tray with plastic top for school and home use.

Recommendations for 1973 - 1974

1) Further development of "Overhead Joy Stick" (12), for more classroom activities.
2) Investigation into methods of inhibiting the startle reaction in order to upgrade speed of response.
3) Investigation into descriptive terminology of a C.P. working with a specific interface to give a clearer picture to non-medical staff, parents, and those reading reports. Which would help in the selection of the proper interface for a particular child.
4) Further development of interfaces and display units.
5) Develop mobility devices for the severely handicapped child to extend and enhance his environment.
6) For the less handicapped an extended A.D.L. programme aimed at independence in dressing, feeding, hygiene, transfer activities, etc.
7) A typing programme should be developed for children ready for spelling. (This was begun a year ago, but due to lack of staff time, was not carried out)
   For the more involved child investigate use of electronic devices for typing. It is difficult to foresee trial of electronic methods due to the great amount of financial assistance required.
8) Development of a controlled feeding programme. This is very important because only when a child has mastered the sucking and swallowing skills is he able to form words.
9) A better system of recording the on-going programme.
10) Work out an assessment form applicable to the programme.

SUMMARY:

"Occupational therapy is a method of treatment which is closely allied to teaching, especially in the pre-school period. It's purpose is to improve fine motor skills, develop self-help and daily living activities such as feeding and dressing, and to undertake, together with teachers and psychologists, training in many aspects of learning such as improving visual perceptual skills and specialized methods of communication." (Reference 1, Pg. 24)

The Occupational Therapist has a unique position in the Bliss project. The case studies presented in this report seem to indicate that the O.T. was only involved in assisting to design and develop the interfaces. While this was her main function, she cannot overlook the child as a whole so she was therefore involved with proper seating, mobility, developing training, typing and supervising feeding.

Only when a child is seated in a reflex inhibiting position is he able to perform a specific function. In order to achieve good results a very careful study is made of reflexes and reactions of the whole body and how they can be properly influenced.

While emphasizing making an interface work one is in danger of forgetting that, for his development, mobility to explore, experience with pencil and crayons, learning position of body in space, and learning to persist in simple tasks are invaluable aids to improving perceptual ability and pave the way for more formal learning later.

Proper feeding will teach a child to suck, chew and swallow, this will also improve drolling and aid in the development of forming words.

While the O.T. was aware of all these factors there was not sufficient time to pursue them.

In reviewing progress made in the past year the O.T.'s function was successful in most cases with regard to primary requirements of seating and interfaces.

Although we did not find the perfect answer to operating a display unit effectively in all situations we did achieve, for a non-verbal child, the ability to get a message across and express ideas and opinions to others.

There is a danger of comparing these hadicapped youngsters with normal children. We must remember that no therapy programme or technical progress will replace the damage to the brain in the C.P., therefore improvement, no matter how small, must be considered as progress.

Another point to remember is that C.P.'s do not realize their slowness, they react with frustration only when they do not meet adult expectations. "It is remarkable that so many spastic children (C.P.'s) show such cheerfulness, patience and dogged determination in the face of so many obstacles." and "Obviously the more independent a child can become, the more skills he can acquire, the greater the sense of achievement and feeling of self-confidence will be. Depression and anxiety may occur in adolescence, but in childhood, goven good therapy, good teaching and an accepting, supporting home behind him, the cerebral palsied child can enjoy life at school and at home." (Reference 2, Pg. 30)

Reviewing the overall goal of the project with regard to whether each child did or did not progress, I would like to close my report with this quote:

"Sometimes rapid skill in their use (of equipment and symbols), is expected and much disappointment experienced when immediate success is not forthcoming, it is most important to teach him that <u>he can only hurry slowly</u>." (Reference 3, Pg. 23)

Margrit Beesley, O.T. Reg.

I would like to thank Scott Walder, Rehabilitation Engineering, for his technical skill in designing and reporting on the developed interfaces.

## REFERENCES

Quoted References 1, 2 and 3:
The Handicapped Child,
Bowley & Gardner
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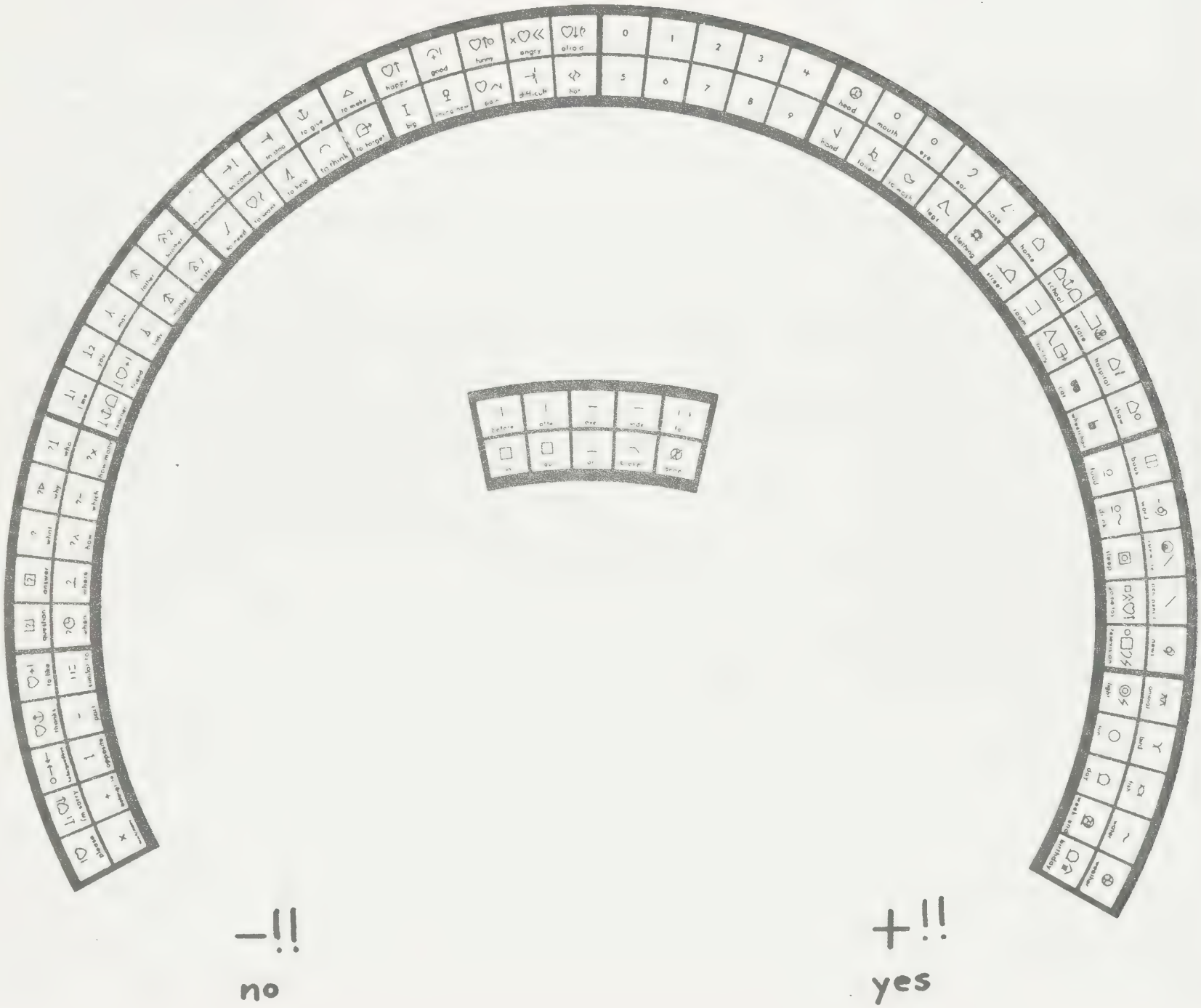
Handling the Young Cerebral Palsied Child at Home,
Nancie R. Finnie

Abnormal Postural Reflex Activity caused by Brain Lesions,
Berta Bobath

# APPENDIX A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pen pencil
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wheelchair
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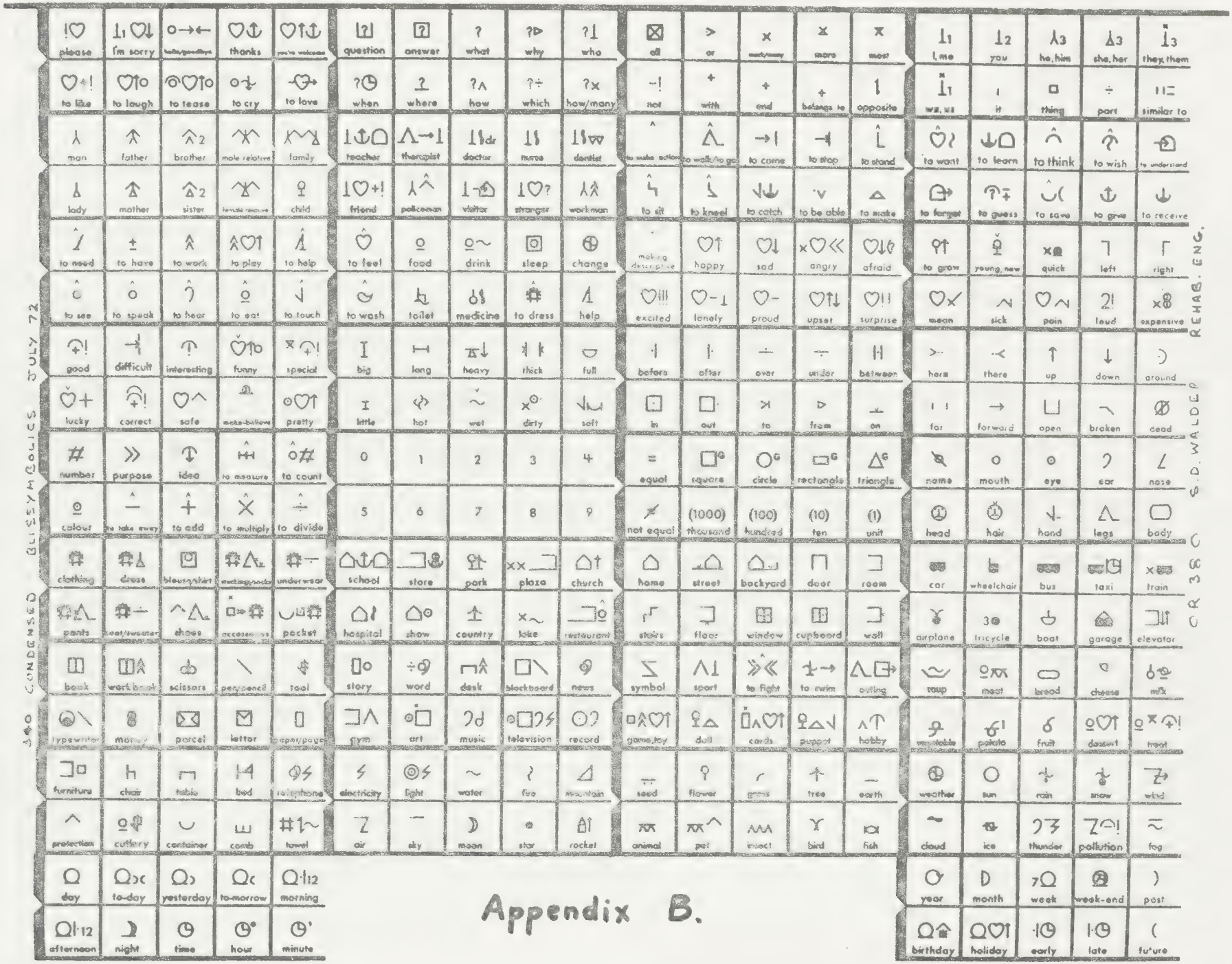
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to laugh
to tease
to cry
to love
when
where
how
which
how/many
not
with
and
belongs to
opposite
we, us
it
thing
part
similar to
man
father
brother
male relative
family
teacher
therapist
doctor
nurse
dentist
to walk/to go
to come
to stop
to stand
to want
to learn
to think
to wish
to understand
lady
mother
sister
female relative
child
friend
policeman
visitor
stranger
workman
to sit
to kneel
to catch
to be able
to make
to forget
to guess
to save
to give
to receive
to need
to have
to work
to play
to help
to feel
food
drink
sleep
change
happy
sad
angry
afraid
to grow
young, new
quick
left
right
to see
to speak
to hear
to eat
to touch
to wash
toilet
medicine
to dress
help
excited
lonely
proud
upset
surprise
mean
sick
pain
loud
expensive
good
difficult
interesting
funny
special
big
long
heavy
thick
full
before
after
over
under
between
here
there
up
down
around
lucky
correct
safe
make-believe
pretty
little
hot
wet
dirty
soft
in
out
to
from
on
far
forward
open
broken
dead
number
purpose
idea
to measure
to count
0
1
2
3
4
equal
square
circle
rectangle
triangle
name
mouth
eye
ear
nose
colour
to take away
to add
to multiply
to divide
5
6
7
8
9
not equal
(1000) thousand
(100) hundred
(10) ten
(1) unit
head
hair
hand
legs
body
clothing
dress
blouse/shirt
underwear
school
store
park
plaza
church
home
street
backyard
door
room
car
wheelchair
bus
taxi
train
pants
coat/sweater
shoes
pocket
hospital
show
country
lake
restaurant
stairs
floor
window
cupboard
wall
airplane
tricycle
boat
garage
elevator
book
work book
scissors
pen/pencil
tool
story
word
desk
blackboard
news
symbol
sport
to fight
to swim
outing
soup
meat
bread
cheese
milk
typewriter
money
parcel
letter
paper/page
gym
art
music
television
record
game, toy
doll
cards
puppet
hobby
vegetable
potato
fruit
dessert
treat
furniture
chair
table
bed
telephone
electricity
light
water
fire
mountain
seed
flower
grass
tree
earth
weather
sun
rain
snow
wind
protection
cutlery
container
comb
towel
air
sky
moon
star
rocket
animal
pet
insect
bird
fish
cloud
ice
thunder
pollution
fog
day
to-day
yesterday
to-morrow
morning
year
month
week
week-end
past
afternoon
night
time
hour
minute
birthday
holiday
early
late
future
BLISSYMBOLICS JULY 72
CONDENSED
340
S.D. WALDEP
REHAB. ENG.
CR 36

# Appendix B.

## APPENDIX C

First 30 Symbols - displayed on wooden tray

Size 2½" x 2½"

| | |
|---|---|
| Yes | hands |
| no | legs |
| hello/goodbye | toilet |
| man | food |
| lady | drink |
| father | to wash |
| mother | to make action |
| home | happy |
| animal | sad |
| I, me | angry |
| you | big |
| to like | little |
| to want | question |
| eye | sister |
| mouth | brother |

APPENDIX D

ONTARIO CRIPPLED CHILDREN'S CENTRE
SCHOOL

Steven

January 31st, 1973
B.D. Sept. 17/63
History #00-27-91

We would like to request that consideration be given to Steven transferring back to an appropriate setting within the Public School system at the earliest date, upon which arrangements can be made. We feel that the symbol instruction class is no longer conducive to meeting Steven's needs for the following reasons:

1. Steven's rate of learning symbols for the purpose of effective communication is slow. Although he knows the meaning of approximately 50 symbols, he has difficulty finding them in order to use them functionally. He is not motivated to expand his symbol vocabulary, rather he often "acts out" during symbol instruction. Considering the most recent psychological assessment, it is likely that Steven's difficulties in organizing visual stimuli and in figure-ground relationships are factors contributing to his limited progress in symbol use. He is able to remember individual symbols well, but he resists locating the required symbol on the 340 symbol display. His attitude is the reverse with regard to responding to the symbol conversation of his classmates. When they point to symbols to express their ideas, Steven follows with interest and understanding. The learning goals of the 100 symbol-display class, would have been more appropriate for Steven. In the 100 symbol-display class, the presentation of symbols has been much more gradual; in January this class is working with a 40 symbol-display. With a smaller symbol vocabulary, location of the symbol would be a much easier task for Steven. Due to the extreme physical involvement of the children in the 100 symbol-display class, however, and the resultant slow instruction and response pace, this setting would be inappropriate for Steven in all respects other than symbol expectations. A transfer to this group, therefore, cannot be recommended.

2. The original aim for Steven's symbol instruction was that symbols could supplement his speech, this giving him greater communicative ability and thereby reducing some of the frustration he feels when he is constantly not understood. Because of Steven's visual organization difficulties, the use of symbols becomes an added strain rather than an aid, thus increasing his frustration rather than reducing it.

3. Steven's willingness to speak has improved during the 5 months he has spent in the Bliss Project. This is attributed to his speech therapy programme complimented by the opportunity to gain confidence in a small class, (5 children) with a low staff-child ratio, (frequently 1 to 1). It would appear most beneficial at this time to concentrate upon developing Steven's confidence in his berbal communication. Such psychological structuring however, is not the primary task of the Bliss Project Class, although speech confidence can and has resulted as a secondary benefit of symbol use.

4. Steven finds the learning of academic skills difficult. Recognizing that the location of symbols is a weak area for Steven, it seems unfair

to pursue the Bliss programme further with Steven. At present his time could more profitably be spent on the learning of basic reading and number skills. Due to limited resources alternate symbol display methods which might aid Steven's development cannot be explored at the present time. It is unfortunate that the visual presentation of the total symbol display, which is proving to be appropriate for the other children in the class has not adequately fulfilled Steven's needs.

5. Steven's behaviour has regressed since his early months in the class. Several factors could be contributing to this:

   a) The strain of beginning a new and what psychology has recently discovered to be a difficult area of learning for Steven.

   b) The style of a classroom and school which is designed for more severely physically-handicapped children since Steven's excessive need for physical activity cannot be fully met in our setting. Special arrangements have been made for Steven, which include daily swimming and physical exercise at noon time. These compensatory measures have not proved adequate.

   c) The change in family routines resulting from Mother beginning to work.

   d) The necessity of relating to many adults in this setting. Steven has a morning and an afternoon teacher, a teacher-aide and numerous volunteers to respond to.

Whatever the major factor, there has been a noticeably progressive increase in Steven's refusal to cooperate with class routines, his attempts to manipulate, test, and play one adult against the other and his disobeying of rules.

In summary,

1. Due to the restrictions in programme imposed by the research nature of the Bliss Project Classes, we are unable to provide a suitable class placement or a suitable symbol display for Steven's learning needs.

2. Due to the nature of the Centre's programme we are unable to meet Steven's physical and consistent structure requirements.

It is recommended that symbol instruction be discontinued and that Steven return to a public school setting in which emphasis can be placed upon his continued growth of confidence in his speech capability, upon the learning of basic academic skills, and upon fostering appropriate social behaviours.

(Mrs.) S. McNaughton,
Communication Class Teacher

In future, consideration could well be given to a display which presents only one symbol at a time, similar to the wheel design contributed by C.K. Bliss, September, 1972. It may be that such a display would be appropriate for children with visual difficulties such as Steven has.

SUGGESTIONS FOR COMMUNICATION WITH SYMBOLS APPENDIX E

## Enrich The Language

Do not restrict your reading of a symbol to the word printed beneath it, but exploit the flexibility of English for paraphrase, and try to think of synonyms.

For example to come might be expressed not only by "come" or "came", but, depending on the context, also by "arrive", reach, get to, be on one's way", etc., or even by "bring".

## Make The Child Think

Encourage the child to use his imagination:
If you have not understood something, ask the child to give you more information, or to say it another way.

Try not to resort to mere guesswork.

## Freedom of Speech

It may be better not to correct an apparent error (i.e. don't say "No, that's not the right way to say that"); but you could suggest alternatives (so long as you're sure you know what is being said).

## Complete Sentences

Try to encourage full sentence structures:

Do not "translate" out loud each symbol as it is signed, but wait for a statement to be completed:

than, either, put the statement into normal spoken English as one whole unit (to allow the child to indicate whether you have got the "right message" or not).

or, if you feel you have understood correctly, respond by word or action as you would in an ordinary speech-situation.

Encourage the use of grammatical elements,

| | | | | | |
|---|---|---|---|---|---|
| such as the tense-markers | past | present | future | | |
| the definite article | the | | | | |
| and the prepositions | in | out | before | over | etc. |

These words help to reduce uncertainty.

## "400" VOCABULARY

This is a temporary display for use until the new vocabulary is ready in September. It consists of the "340" vocabulary plus 46 new symbols.

Two prototypes of an electronic inter-personal display will utilize this vocabulary and will be introduced into the classroom mid June.

---

CHANGES WITHIN THE "340"

| | | |
|---|---|---|
| to try | replaces | to help |
| gathering | replaces | puppet |
| on | Symbol has been changed by making line shorter. A long line with indicator is in the new vocabulary. | |

place is the new meaning.

New Symbols

The symbols on the right side of display and coloured mauve, include punctuation marks, "small word helpers" and "symbol helpers".

composed of followed by a symbol enables child to tell the material of which a thing is made. This can be used when trying to identify an object for which no symbol appears. New symbols for plastic, glass, metal, cloth are close by. For wood, tree can be used.

Relativizer derives its meaning from the word it follows. It can mean place where, time when, person who, thing which, or (reason why) i.e. because.

enough is derived from equal to need.

too is derived from more than need. (an error has appeared; it has been drawn as most)

Symbol position is to be used if child wants to utilize a symbol already on the display but in a new position. He can point to the symbol needed, then to symbol position and then indicate earth or sky position.

Symbol part is to be used if child wishes to extract an element from a symbol already appearing on the display. e.g. the cross could be taken from church and combined with day to form Easter

It is not anticipated that Symbol part and Symbol position will be used frequently, or with persons new to symbols, but we would like to see if they can provide a way for the children to compose new symbols utilizing elements from compound symbols already available to them.

Appearing above the display is the symbol to combine. It is being tried as a signal to the "listener" to consider all the symbols which follow it as combining to form one idea, person or thing. To combine is also indicated at the end of the series of symbols to signify the completion of the compound symbol.

In writing the symbol, to combine can be omitted, but the symbol elements should be positionned close together, indicating a compound symbol. The to combine symbol can also be used when the child is creating his own compound symbol for a special idea or event. In forming a compound symbol, the classifier element should appear first. This can be explained to child by asking, "What sort of thing is it? That comes first" (Some errors appear in the "340"; these will be corrected in July!

## LEVELS THROUGH WHICH CHILD MOVES IN BECOMING FLUENT WITH SYMBOLS

APPENDIX G

1. Learning through experience that symbols have a relationship with speech, that symbols carry meaning.
2. Learning the symbol-meaning relationship for each symbol in the vocabulary.
3. Developing speed in locating the symbols.
4. Learning to use symbols actively to communicate.
5. Exploring and developing own individual use of symbols, (while syntax is being gradually introduced.)
6. Training in syntax - English order
7. Training in morphology - recognition and utilization of symbol components.
8. Through many experiences, becoming spontaneous or atuomatic in symbol respons
9. Experiencing a wide variety of relationships in order to learn two distinct ways of using symbols:
   A. English order
   B. Telegraphic style - utilizing all the short cuts possible without destroying meaning.
10. Developing the ability to utilize symbol strategies (methods of combining symbols in order to make the most efficient use of the symbol vocabulary), recognizing that due to individual capability levels, there will be a different range of coding levels attainable by different children.
11. Developing the ability to utilize classifiers so that information can be given efficiently. (Similar to 20 question technique, but child uses the classifiers to structure his "output".)

APPENDIX H

This booklet gives you guidelines on how to use the symbols, especially in forming a complete sentence. We hope that the patterns or rules in the booklet will in the future allow your children to express themselves more clearly and easily in a wide range of situations. Familiarity with these patterns will also be an important step towards reading and writing ordinary English, since we are trying to follow English word-order as closely as possible. The children are not yet used to following these rules, but if you use them yourselves you will be setting them a good example - the more confident you are yourselves, the better it will be for your children to see. As the rules are close to English they should not be too difficult for you to learn. When the symbol-rules are different from English word-order, this will be pointed out.

You can put these guidelines to use whenever you are writing something down in symbols, for instance writing a letter or a story, or leaving a message for your child, or if you are "talking" silently to your child with his symbol tray.

A note: When writing symbols down, be sure to leave plenty of space between the symbols, so each one is clearly visible!

(signed)

Oliver Mott

## COMPLETE SENTENCE STRUCTURE

Except for commands (see p. 5), a complete sentence should have at least a subject, a tense, and a verb or an adjective.

The subject is the doer of the action, or the person or thing you are talking about.

The tense tells you when the action takes place, or when a description refers to past, present or future time.

Verbs (e.g. "come, see, want") and adjectives ("good, afraid, young" either indicate actions or give a description of the subject.

## STATEMENTS

| SUBJECT | TENSE | VERB OR ADJECTIVE |
|---|---|---|
| The house | is | big. |
| He | did | come. (or "He came") |
| Her father | is going to | laugh. |

If you are saying where something is, no verb-symbol is required but just the tense:

| SUBJECT | TENSE | PLACE-PHRASE |
|---|---|---|
| My book | is | on the table. |
| She | was | here. |

## NEGATIVE STATEMENTS

Place the symbol ("not") after the tense.

| | | |
|---|---|---|
| The house | isn't | big. |
| Bill | didn't | come. |
| She | will not be | here. |

QUESTIONS

To form a question, start off with a question-symbol ("who, what, why etc., or just [?] "question"), and switch the subject and the tense-marker around.

The teacher is thinking.

Is the teacher thinking?

My new book was here.

Where was my new book?

She likes to swim.

Does she like swimming?

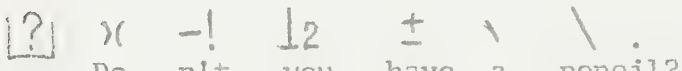
Why did you go?
Why have you gone?

Who did you see?

NEGATIVE QUESTIONS

Put the symbol −! ("not") after the tense.





COMMANDS

To form a command, start off either with !♡ ("please") for a polite request, or with ! for an order. As in English, no subject noun and no tense marker are needed.

! Λ̂.
Go away.

!♡ Λ̂.
Please go away.

!♡ ↕ ⊥| (some) milk. ! Put it on the table.

In commands with the verb "be" and an adjective, such as "be good", "don't be afraid", use the symbol Φ̂ ("to be, live"), followed by the adjective.

!♡ Φ̂ +!.
Be good.

!♡ Φ̂ !♡↓(?.
Be brave.

NEGATIVE COMMANDS

Put the symbol −! before the verb:

!♡ −! Λ̂.
Please don't go.

! −! Φ̂ ♡↓(?.
Don't be afraid.

! −! ↓̂ !.
Don't touch it.

# APPENDIX I

Piaget's Stages of Cognitive Development

Sensorimotor stage (0-2 years.)

Preoperational Stage (2 to 7 years)
- Preconceptual thought (2 to 4 years)
- Intuitive thought (4 to 7 years)

Operational Stage ( 7 to 16 years)
- Concrete operational thought (7 to 11 years)
- Formal Operational thought (11 to 16 years.)